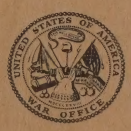
TM 11-692

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

RADIO SET

AN/MRC-20



DEPARTMENT OF THE ARMY • MARCH 1954

TECHNICAL MANUAL)
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No. 11-692)

DEPARTMENT OF THE ARMY

Washington 25, D. C., 5 March 1954

RADIO SET AN/MRC-20

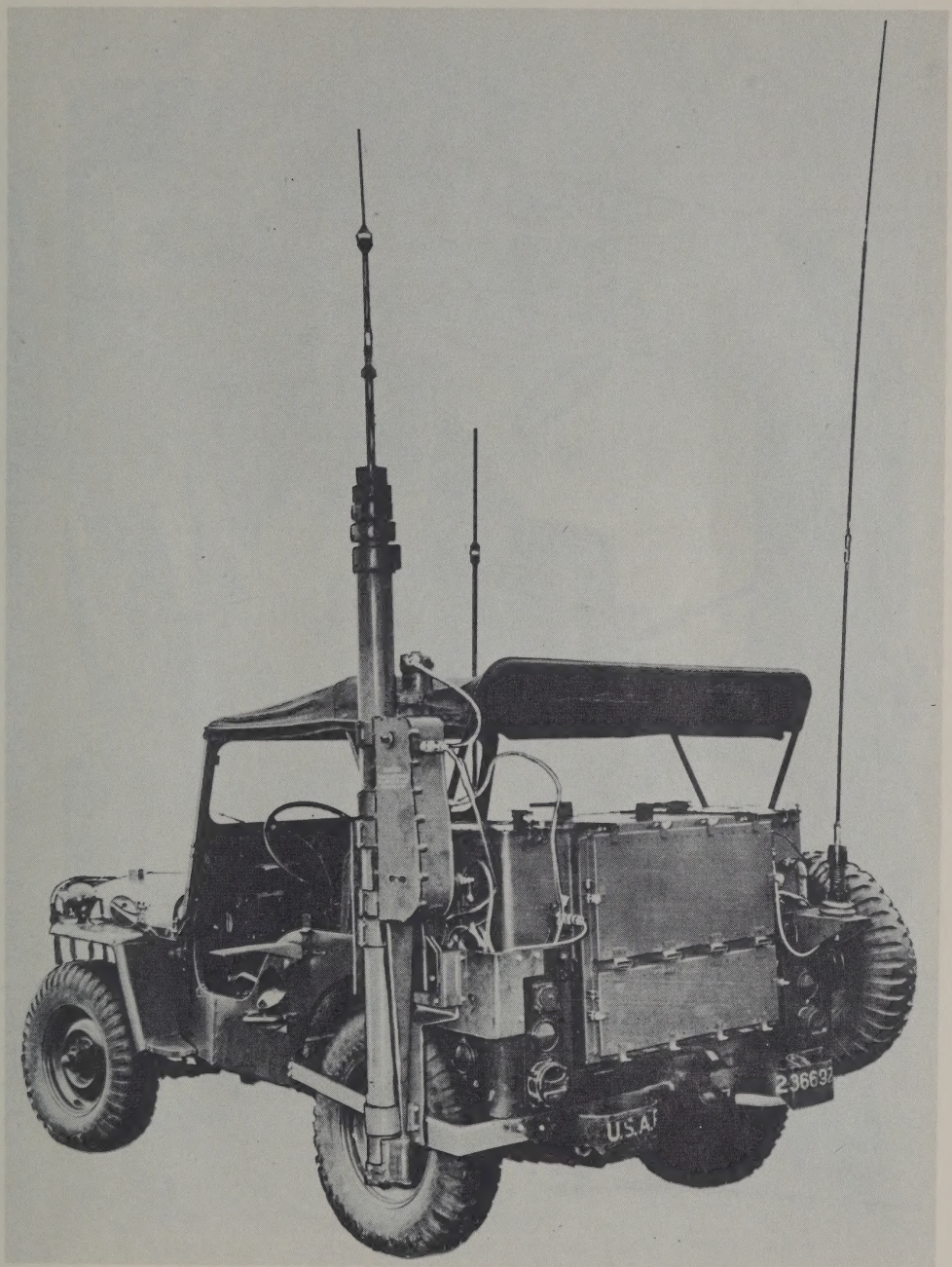


Figure 1-1, Sheet 1, AN/MRC-20 Radio Set Mounted in M-38 Truck, Rear View.

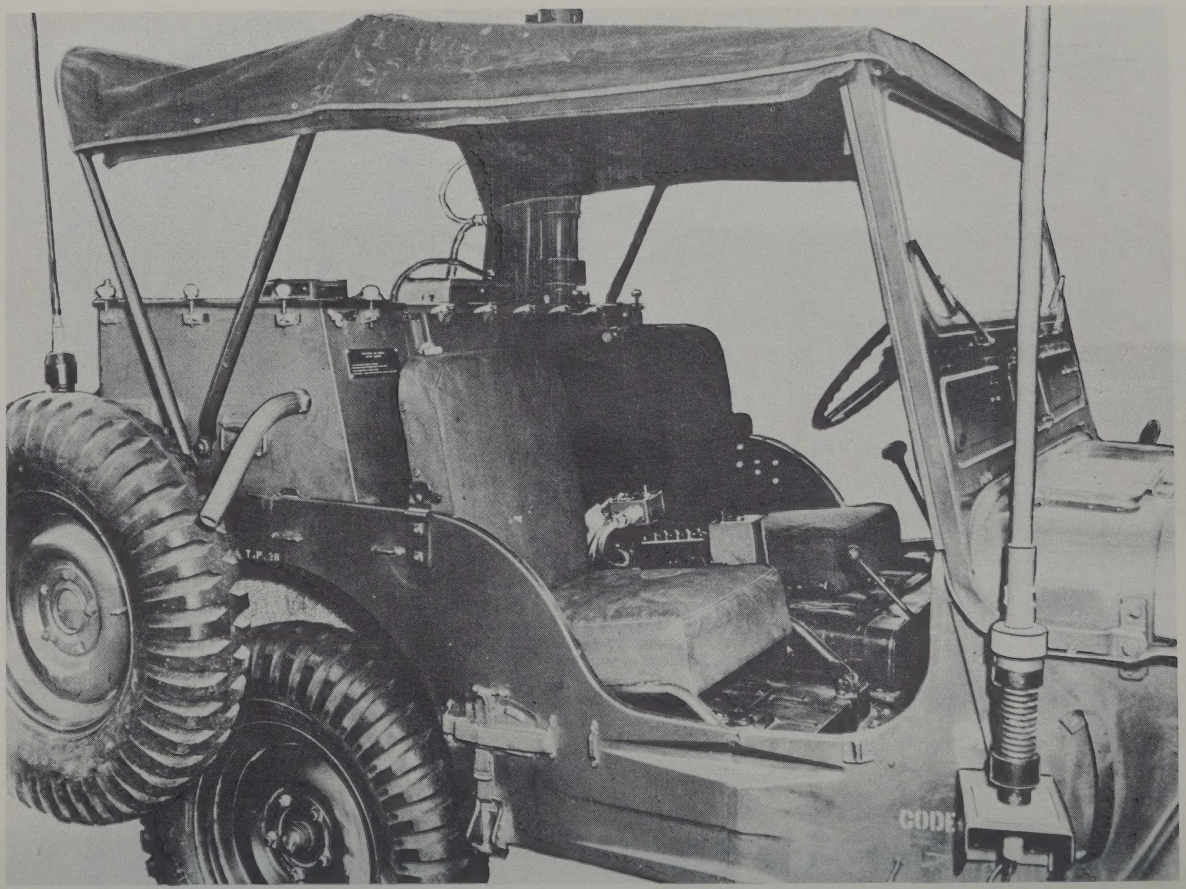
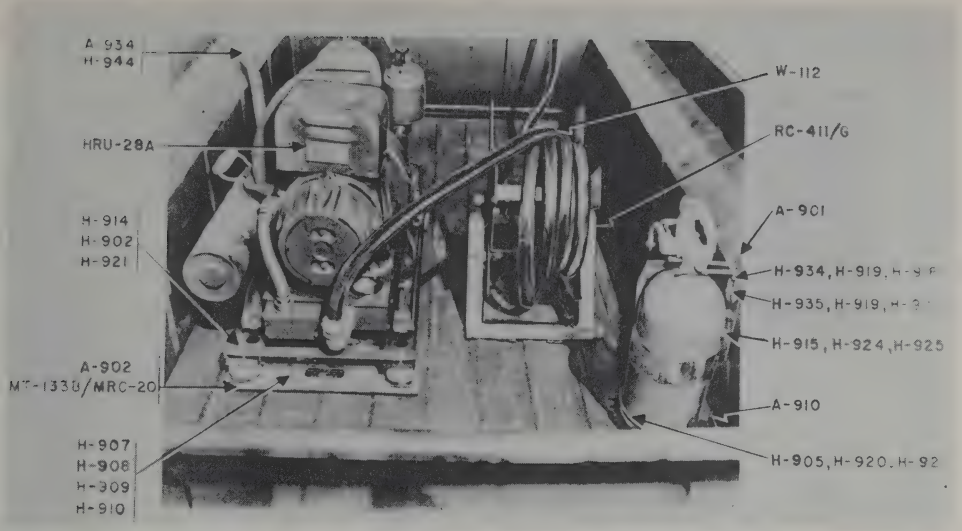
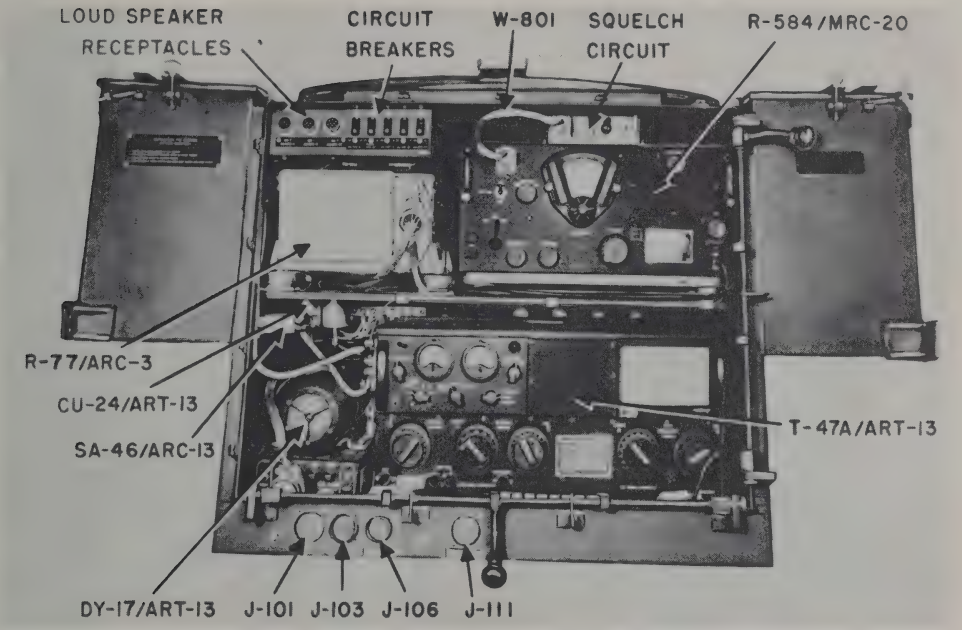


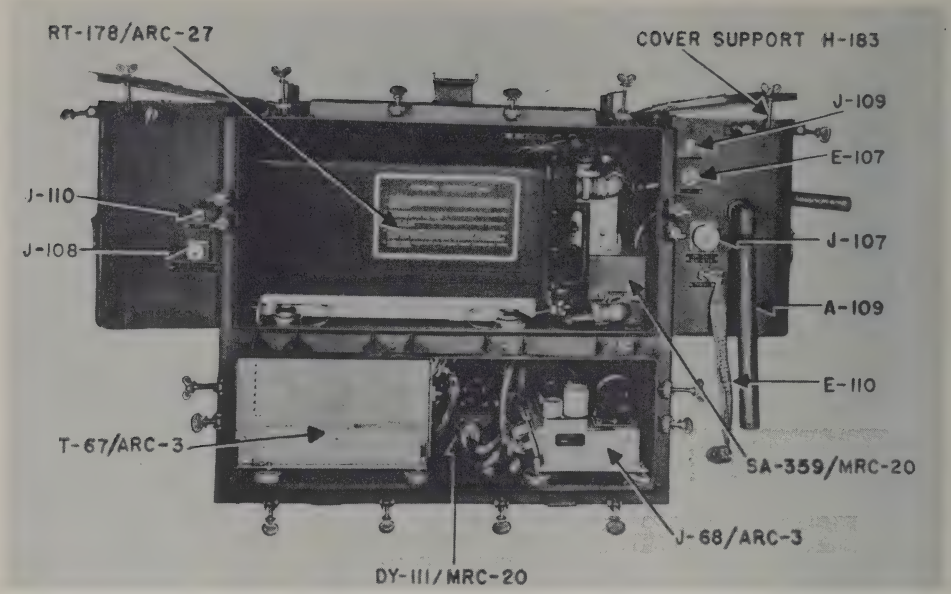
Figure 1-1, Sheet 2. AN/MRC-20 Radio Set Mounted in M-38 Truck, Side View



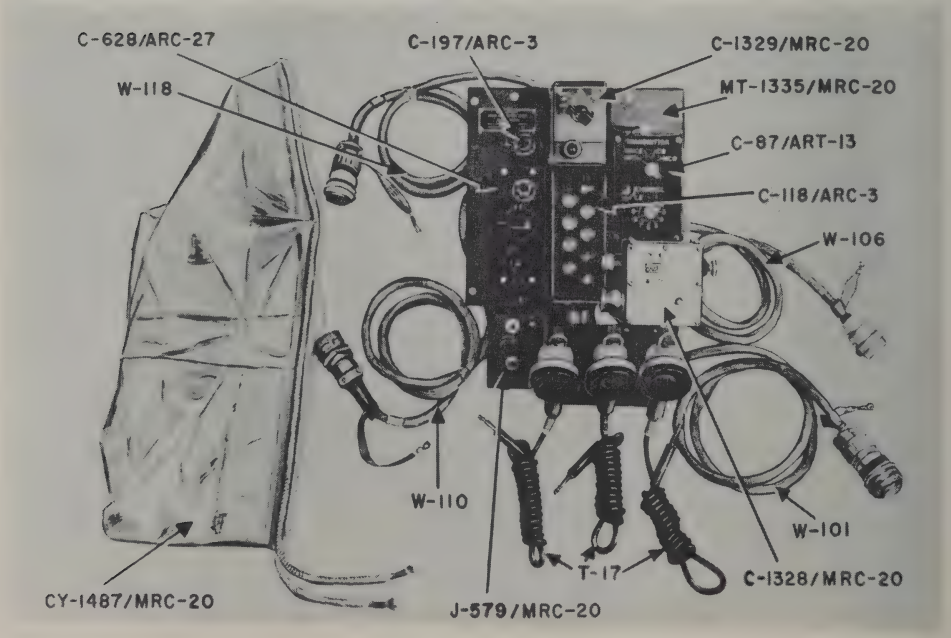
A. Trailer with Equipment



B. Electrical Equipment Cabinet, Front View, Cover Removed
Figure 1-1, Sheet 3. AN/MRC-20 Radio Set



A. Electrical Equipment Cabinet, Rear View, Doors Removed



B. Control Group Assembly

Figure 1-1, Sheet 4. Overall View of AN/MRC-20 Radio Set

SECTION I

DESCRIPTION OF MAJOR COMPONENTS

1-1. GENERAL. Radio Set AN/MRC-20 (see figure 1-1) is an assembly of HF, VHF, UHF transmitting and receiving equipment arranged for vehicular installation and operation. Its purpose is to provide a mobile transmitting-receiving system capable of operating on three different ranges, either separately, simultaneously, or automatically by voice control, to increase the flexibility of ground and/or ground to air communication and to enlarge the range of fixed stations.

TABLE I EQUIPMENT SUPPLIED

QUANTITY	NAME OF COMPONENT	DESIGNATION
	Radio Set Group	OA-563/MRC-20
1	Cabinet, Electrical Equipment	CY-1482/MRC-20
1	Radio Receiver	R-77/ARC-3
1	Radio Transmitter	T-67/ARC-3
1	Dynamotor	DY-21/ARC-3
1	Power Junction Box	J-68/ARC-3
1	Radio Receiver	R-584/MRC-20
1	Mounting, Radio Receiver	MT-1334/MRC-20
1	Radio Transmitter	T-47A/ART-13
1	Mounting, Radio Transmitter	MT-283/ART-13
2	Mounting, Radio Transmitter	MT-1339/MRC-20
1	Dynamotor	DY-17/ART-13
1	Mounting, Dynamotor	MT-164/ART-13

TABLE I EQUIPMENT SUPPLIED

QUANTITY	NAME OF COMPONENT	DESIGNATION
1	Switch	SA-46/ART-13
1	Capacitor, Antenna Shunt	CU-24/ART-13
1	Radio Set	RT-178/ARC-27
1	Mounting, Radio Set	MT-822B/ARC-27
1	Control, Radio Set	C-626/ARC-27
1	Mounting, Radio Set Control	MT-821/ARC-27
1	Jack Box	J-579/MRC-20
1	Electronic Switch	SA-359/MRC-20
1	Dynamotor	DY-111/MRC-20
1	Mounting, Dynamotor	MT-1337/MRC-20
2	Remote Control Sets	RC-261
1	Battery Box	CY-1483/MRC-20
1	Mounting, Electronic Switch	MT-1336/MRC-20
	Radio Set Control Group	OA-564/MRC-20
1	Mounting, Control Panel	MT-1335/MRC-20
1	Control, AN/ARC-3	C-118A/ARC-3
1	Control, AN/ART-13	C-87/ART-13
1	Mounting, AN/ART-13	MT-163/ART-13
1	Control, Volume	C-197/ARC-3
1	Control, AN/ARC-27	C-628/ARC-27
1	Control, Remote Switching	C-1329/MRC-20
1	Control, Telescopic Mast	C-1328/MRC-20

TABLE I EQUIPMENT SUPPLIED

QUANTITY	NAME OF COMPONENT	DESIGNATION
	Accessories	
1	Antenna, HF	MS-49, MS-50, MS-52 MS-52, MS-53
1	Mounting, HF Antenna	MP-49
1	Antenna, VHF	AT-462/MRC-20
1	Mast, VHF Amtenna	AB-349/MRC-20
1	Mounting, VHF Antenna Mast	MP-50
1	Antenna, UHF	AT-463/MRC-20
1	Mast, Telescopic	AB-348/MRC-20
1	Mounting, Telescopic Mast	AB-350/MRC-20
1	Power Unit	HRU-28A
2	Mounting, Power Unit	MT-1338/MRC-20
1	Reel, Power Cable	RC-411/G
2	Battery, Storage	2HNR-US
3	Microphones	T-17
3	Headsets	HS-33
3	Loudspeakers	LS-166/U
1	Mounting, Fire Extinguisher	MT-1340/G
1	Mounting Kit M-37 Truck	MK-152/MRC-20
	Interconnecting Cables	
1	Cable, Interconnecting	W-801, CX 2557/U(1 ft 4 in)
1		W-101, CX 2558/U (5 ft 2 in.)
1		2-103, CX 2559/U (2 ft 9-1/2 in.)

TABLE I EQUIPMENT SUPPLIED

QUANTITY	NAME OF COMPONENT	DESIGNATION
1		2-104; CS 2560/U (5 ft 2-1/2 in.)
1		W-104; CX 2561/U (4 ft 2 in.)
1		W-106; CS 2562/U (5 ft 2 in.)
1		W-108; CS 2563/U (3 ft 3 in.)
1		W-109; CS 2564/U (3 ft 9 in.)
1		W-110; CS 2565/U (5 ft 2 in.)
1		W-112; CS 2566/U (25 ft 3 in.)
1		W-113; CS 2567/U (6 ft 1 in.)
1		W-114; CS 2568/U (12 ft 2 in.)
1		W-118; CS 2569/U (5 ft 2 in.)
1	Cable, RF	W-117; CG-1111/U (5 ft 2 in.)
1		W-116; CG-1114/U (3 ft 6 in.)
1		W-115; CG-332C/U (5 ft 4 in.)
1		W-122; CG-409C/U (5 ft 0 in.)

TABLE II EQUIPMENT REQUIRED BUT NOT SUPPLIED

QUANTITY	NAME OF COMPONENT	DESIGNATION
1	Truck, 1/4 ton, 4 by 4, Command Reconnaisance with 1/4 ton, 2W, Cargo Trailer or Truck, 3/4 ton, 4 by 4	M-38 M-37
1	Fire Extinguisher	
4	Gasoline Cans, 5 Gallons	7600-024-100
1	Pouring Spout	
1 set	Crystals, Radio Transmitting	
4	Batteries, Dry	BA-30

1-2. DESCRIPTION AND PURPOSE OF MAJOR COMPONENTS.

1-3. RADIO SET AN/ARC-3 is used to receive and transmit in the 100 to 156 megacycle range. The receiver used is an eight channel, crystal controlled R-77A/ARC-3 receiver (see figure 1-1, sheet 3,B). Channel selection is provided by the control unit. C-118A/ARC-3, and the volume control by the control unit C-197/ARC-3 both located on the control panel (see figure 1-1, sheet 4, B). The transmitter used is a T-67/ARC-3 transmitter (see figure 1-1, sheet 4, A) which operates on any or eight crystal controlled channels selected by the control unit, C-118A/ARC-3. Operating power for both units is furnished by the Dynamotors, DY-21/ARC-3 and DY-22/ARC-3, located on the J-68/ARC-3 power Junction Box (see figure 1-1, sheet 4, A). Primary power for both dynamotors is furnished by the 27.5 volt power supply of the AN/MRC-20 system. All units with the exception of the controls are shock mounted.

1-4. RADIO SET AN/ARC-8. The R-584/MRC-20 receiver and the T-47A/ART-13 transmitter make up the AN/ARC-8 Radio Set. The R-584/MRC-20 receiver may be either a BC-348Q or BC-348R receiver modified by the addition of a two-tube noise limiter and squelch circuit (see figure 1-2) to limit the receiver noise normally present with low or no signal. This limiting action is necessary for the proper operation of the re-transmission Electronic Switch, see paragraph 4-35 below. The noise limiter-squelch circuit consists of two tubes, a 12AU7, V-801, one half of which is used as a diode noise limiter (with noise limiter switch, S-801, ON) and the other half is used in a cathode follower circuit to feed the audio signal from the second detector diode of the receiver to the second tube, a 12AX7, V-802. One half of V-802 is used as a squelch tube to control the bias of the second half which is used as an audio amplifier with its output connected

with the volume control of the receiver. The grid bias on the squelch tube portion is controlled by the rectified DC voltage from the second detector diode. When no signals, or extremely weak signals, are being received there is practically no rectified DC voltage being developed by the second detector which results in very little, if any, bias on the squelch tube. As a result, it draws plate current and produces a large voltage drop across resistor R-812. This, in effect, biases the grid of the audio amplifier portion of V-802 beyond cut-off since it is connected to the plate of the squelch tube through resistor, R-118. This prevents transmission through this tube. When a signal is being received the rectified DC voltage produced biases the squelch tube to a point where current flow stops allowing the audio amplifier portion to operate in normal fashion and pass the signal on to the receiver audio channel. A control, the SQUELCH CONTROL variable resistor, R-809, is connected in the voltage divider circuit to adjust the cathode potential of the squelch tube and thus control the amount of signal necessary to unblock the audio amplifier portion. Schematic diagrams showing the squelch-noise limiter circuit are shown in figure 5-13 and the conversion for the BC-348Q and BC-348R receivers are shown in figures 5-14 and 5-15. The operating power for this receiver is supplied by the 27.5 volt power supply of the AN/MRC-20 system. The frequency coverage of the R-584/MRC-20 receiver is from 200 to 500 KC and from 1.5 to 18.0 megacycles in six bands selected by a band change switch located on the front panel of the receiver.

1-5. The transmitter used in the AN/ARC-8 radio set is the T-47A/ART-13 radio transmitter (see figure 1-1, sheet 3,B) mounted by mounting plate MT-283/ART-13 on a mounting base, MT-1339/MRC-20. Shock mounting is also provided by four shock mounts. Power for the transmitter is provided by a DY-17/ART-13 dynamotor unit mounted on the MT-164/ART-13 mounting with four shock mounts, which operates from the 27.5 volt power supply of the

AN/MRC-20 system. The C-87/ART-13 Control Unit, mounted on the MT-163/ART-13 mounting plate and located on the control panel, (see figure 1-1, sheet 4, B) provides for the selection of the type of emission and the transmitting channel and also provides a microphone input for this transmitter. The CU-24/ART-13 antenna shunt capacitor and the SA-46/ART-13 switch are included for antenna matching. The transmitter may be set up to operate on 10 channels selected by the C-87/ART-13 Control Unit.

1-6. RADIO SET AN/ARC-27, Radio Set AN/ARC-27 is used to receive and transmit on the 325 to 400 megacycle range. The receiver and transmitter are combined in the RT-178/ARC-27 unit, (see figure 1-1, sheet 4, A). The RT-178/ARC-27 Radio Transmitter is mounted on an MT-822/ARC-27 mount, using four Barry type 5215-HT shock mounts, and operates from the AN/MRC-20, 27.5 volt power source. A Jack Box, J-579/MRC-20 is supplied to provide convenient headphone and microphone jacks. The receiver consists of two parts, the main receiver being a triple conversion superhetrodyne using three crystal oscillators with automatic crystal selection to determine the hetrodyne signal. The second, or guard receiver, is an adjustable frequency superhetrodyne receiver. Both receivers work into a common audio output circuit.

1-7. The transmitter has a carrier power output of 9 watts and receives its excitation from the same crystal oscillators employed in the main channel receiver. The transmitter may be either voice or tone modulated.

1-8. Any one of 1750 frequency channels, one tenth of a megacycle apart, may be selected by using the Radio Set Control C-626/ARC-27 located in the left wing compartment of the equipment cabinet (see figure 1-11). Any one

of eighteen present channels or the guard channel may be selected by use of the C-626/ARC-27 control and the C-628/ARC-27 control located on the control panel (see figure 1-1, sheet 4, B). A four position operation selector switch and a volume control are also included on this Control.

1-9. The Jack Box J-579/MRC-20 is a small unit mounted on the operator's control panel, (see figure 1-3) to provide convenient jacks for the microphone and headset connections to the RT-178/ARC-27 unit,

Figure 1-2. Receiver R-584/MRC-20, Showing and Noise Limiter Unit

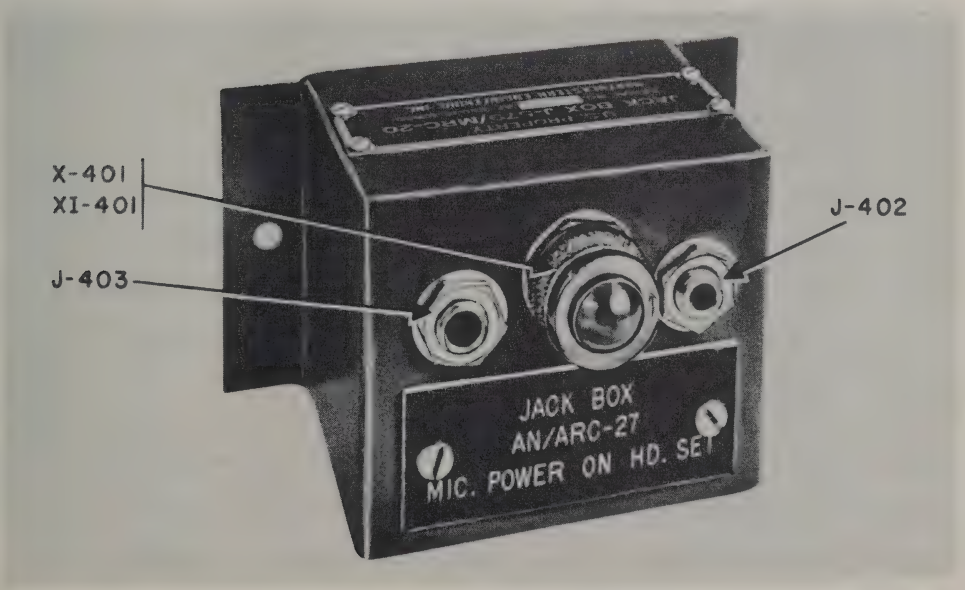


Figure 1-3. Jack Box J-579/MRC-20

which is located in the equipment case out of reach. A pilot light in the primary power circuit of the AN/ARC-27 system is also provided on the Jack Box. Circuit connections for the Jack Box are shown in figure 3-13.

1-10. For further description of the above radio sets see the applicable handbooks for each set.

1-11. REMOTE CONTROL EQUIPMENT RC-261. The remote control equipment RC-261, (see figures 1-9 and 1-10) consists of the RM-52 or C-1200/GRC unit, the RM-53 or C-1201/GRC unit, approximately 1/4 mile of WD-1/TT connecting wire, the DR-8 cable spool and the RL-39A wire reel, and Signal Corps 6H3039/4 crank. Two complete sets are included. They provide a means of remotely controlling any of the receivers and transmitters of the AN/MRC-20 system. For the description of and use of these units see applicable technical manuals.

1-12. RETRANSMISSION ELECTRONIC SWITCH SA-359/MRC-20.

1-13. GENERAL. The electronic switch is shock mounted and located in the rear of the equipment case near the RT-178/ARC-27 unit (see figure 1-4). The dynamotor DY-111/MRC-20 for this unit is located on shock mounts below (see figure 1-6). The schematic diagrams for these units are shown in figures 5-12 and 5-11.

1-14. PURPOSE. The purpose of this unit is to enable any two receiver-transmitter combinations to be operated as voice controlled repeater stations to provide direct two-way communication between two distant points which cannot communicate directly.

1-15. FUNCTION. The Retransmission Electronic Switch SA-359/MRC-20 functions briefly as follows (see figure 1-5), Assume operation with the AN/ARC-3

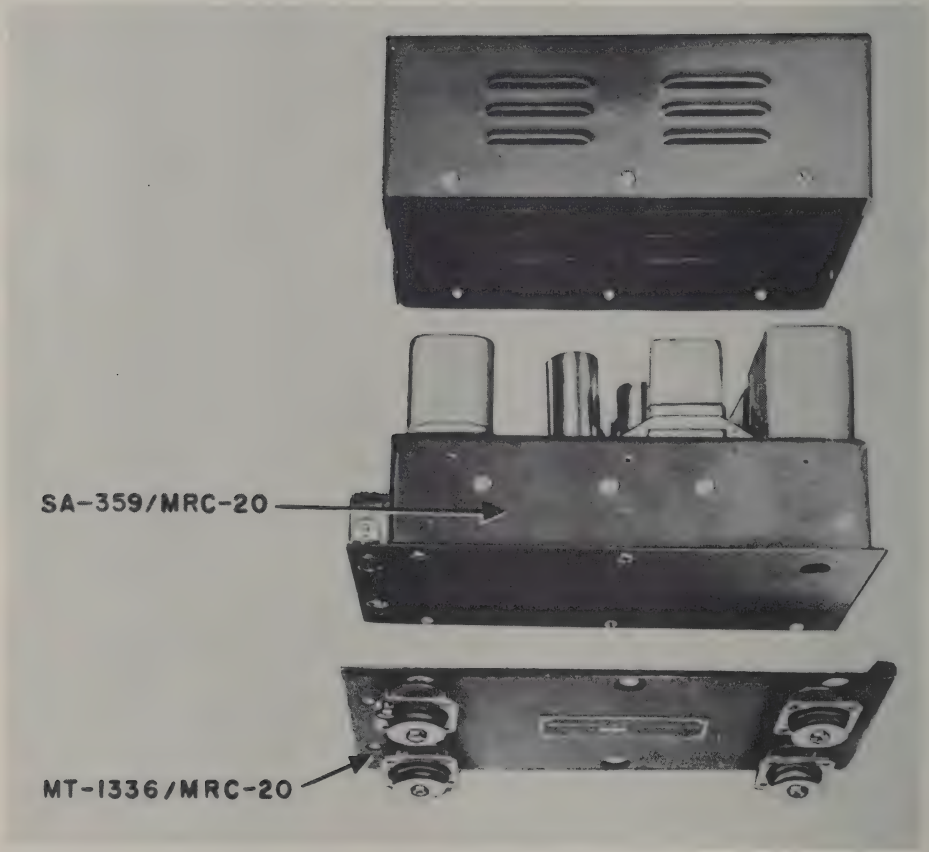


Figure 1-4. Electronic Switch SA-359/MRC-20 and Mounting MT-1336/MRC-20.

TABLE III SA-359/MRC-20 ELECTRONIC SWITCH CHARACTERISTICS

PRIMARY POWER	PLATE POWER	TUBES USED
27.5 Volts; 1.5 Amp	275 Volts, 0.05 Amp.	2 Type 5696; 2 Type 12AU7; 1 Type 12AL5

and the AN/ARC-8 radio sets. A modulated signal emitted by Radio Station 1 on a frequency of f_1 reaches the R-584/MRC-20 radio receiver. The audio output signal of this receiver is fed by way of the Remote Switching Control to Channel A of the Electronic Switch unit. Within this unit, the signal passes through the closed contacts, C, of relay K-202 and buffer amplifier V-204, the output of which is used to modulate the T-67/ARC-3 transmitter. A portion of this signal is also fed to the Transformer T-201, rectified by the Rectifier V-201, and applied to the grid of Thyratron, V-202. This rectified signal is sufficient to stop the normally conducting Thyratron which de-energizes relay K-201. As K-201 is de-energized (1) its contacts C, open breaking the circuit continuity of Channel B preventing any signals present in the receiver R-77A/ARC-3 from interfering with the operation of the Electronic Switch and (2) contacts D, close completing the "Press-To-Talk" circuit of the transmitter T-67/ARC-3. Transmitter T-67/ARC-3 then becomes operative modulated by the output from the R-584/MRC-20 receiver and transmits the message on a frequency f_2 to Radio Station 2. When the audio output from the R-584/MRC-20 receiver ceases, Thyratron V-202 resumes conduction and returns relay K-201 to its energized stand-by state. The return message from Radio Station 2, on a frequency f_2, is relayed to Radio Station 1 in exactly the same manner using,however, Channel B of the

Electronic Switch (which is identical in circuitry and function to Channel A), the receiver R-77A/ARC-3 and the transmitter T-47A/ART-13 which transmits on a frequency f_1. The first audio signal to reach the Electronic Switch determines the selection between Channel A and Channel B.

1-16. ELECTRICAL EQUIPMENT CABINET, CY-1482/MRC-20.

1-17. The Electrical Equipment Cabinet, (see figure 1-7), is a three-section cabinet made of aluminum alloy with stainless steel hinge pins, brackets and thumb screws. All nuts, bolts and screws are cadium

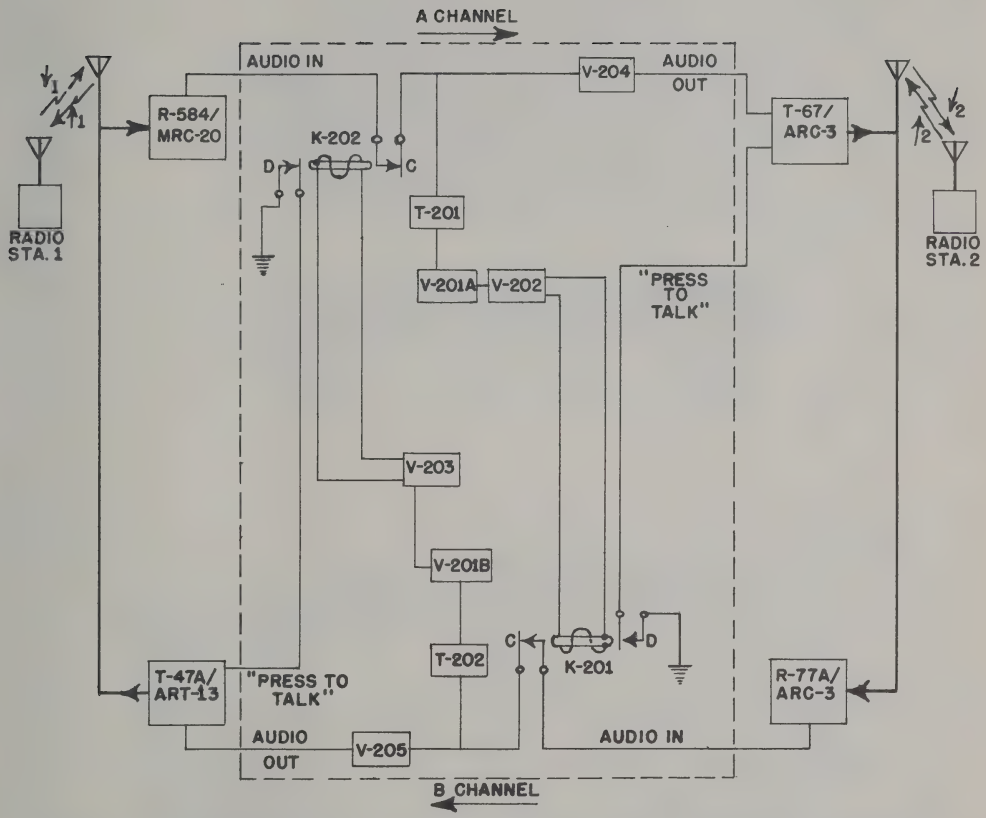


Figure 1-5, Block Diagram, Function of Electronic Switch SA-359/MRC-20.

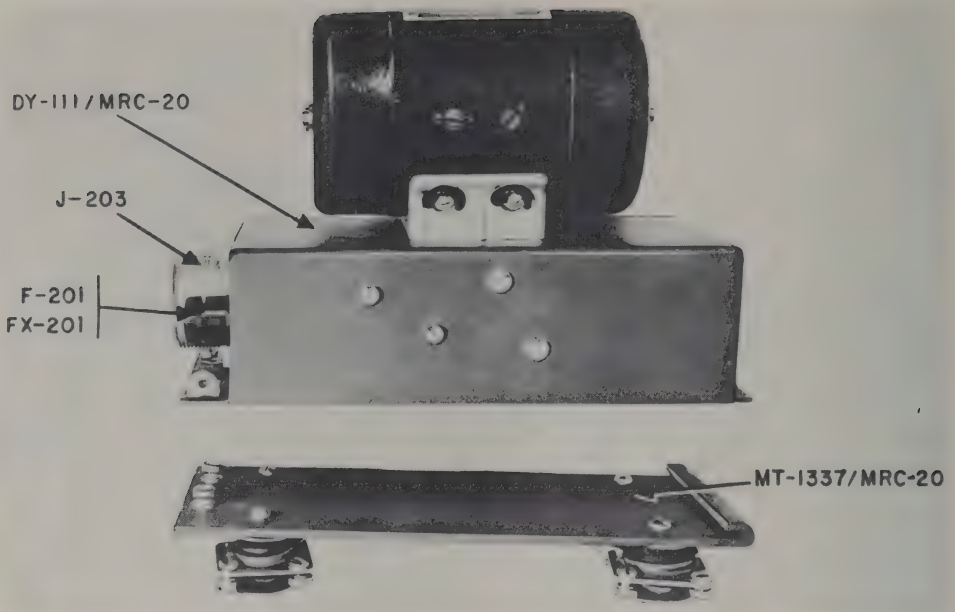


Figure 1-6. Dynamotor DY-111/MRC-20 and Mounting MT-1337/MRC-20

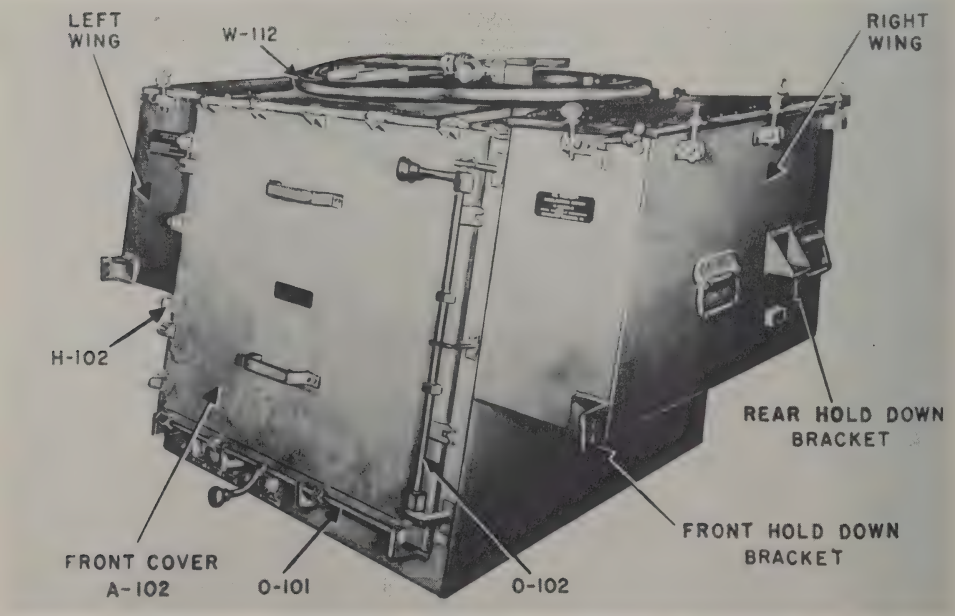


Figure 1-7. Electrical Equipment Cabinet CY-1482/MRC-20

plated steel. All seams are welded to provide splash-proof construction and all doors are gasketed with neoprene gaskets. The main center compartment has a front cover removable by means of a cam assembly and draw-cathes. The rear cover is in two sections, each hinged, and secured by thumb bolts. Each of the two wing sections has a hinged cover, also secured by thumb bolts. It is designed for mounting in an M-38, 1/4 ton, 4 by 4, or M-37, 3/4 ton 4 by 4, vehicle to house the AN/MRC-20 equipment.

1-18. A switch panel, carrying the start and stop primary power circuit breakers and loud speaker receptacles is located in the upper corner of the equipment cabinet.

1-19. RIGHT WING COMPARTMENT. The right wing compartment (see figures 1-8, 1-9 and 1-10) houses the following items: 2 RM-53 Units; 2 DR-8A Cable Spools with approximately 1000 ft. each of WD-1/TT wire, 2 Cranks, Signal Corps Cat. No. 6H3039/4; 2 Reels, RL-39A; 2 Sets Carrying Harness, 3 Extension Cords, W-125; 3 Head Sets, HS-33; 3 Microphones, T-17; 2 Cranks, O-357, for Telescopic Mast.

1-20. LEFT WING COMPARTMENT. The left wing compartment (see figures 1-11, 1-12 and 3-2) houses the following items: Battery Box CY-1483/MRC-20 with two 2HNR-US batteries; ground rod assembly E-101; 3 LS-166/U loudspeakers; 4 lb. hammber H-146; and the control C-626/ARC-27.

1-21. ANTENNAS.

1-22. HIGH FREQUENCY ANTENNA. The HF Antenna used with the AN/ARC-8 Radio Set is a five section whip antenna (see figure 1-13) operative in the

frequency range from 1.5 to 18 megacycles. It is composed of antenna sections MS-49, MS-50, MS-51, MS-52, and MS-53 and is mounted on an MP-57 spring loaded bracket. It is fed by a length of PFGL-10 wire, W-120.

1-23. VHF ANTENNA AND MAST. The VHF antenna, AT-462/MRC-20, (see figure 1-14) is a form of coaxial antenna, vertically mounted on a tubular supporting mast. It consists of two sections insulated from each other, the upper section is 22.094 inches long and 0.75 inches in diameter and the lower section is 22.125 inches long and 1 inch in diameter. The antenna is fed by RG-58C/U concentric cable, 50 ohms impedance, which passes coaxially through the mast tube, the inner conductor of which connects to the upper section and the outer conductor to the lower section. This antenna functions as a broad band receiving and transmitting antenna in the frequency range of 100 to 156 megacycles. It is used with the AN/ARC-3 system.

1-24. The supporting mast AB-349/MRC-20 is a stainless steel tube approximately 39 inches long and mounted on a modified MP-57 spring loaded base which is supported by an MT-50 bracket.

1-25. UHF ANTENNA. The UHF Antenna, AT-463/MRC-20 (see figure 1-14)

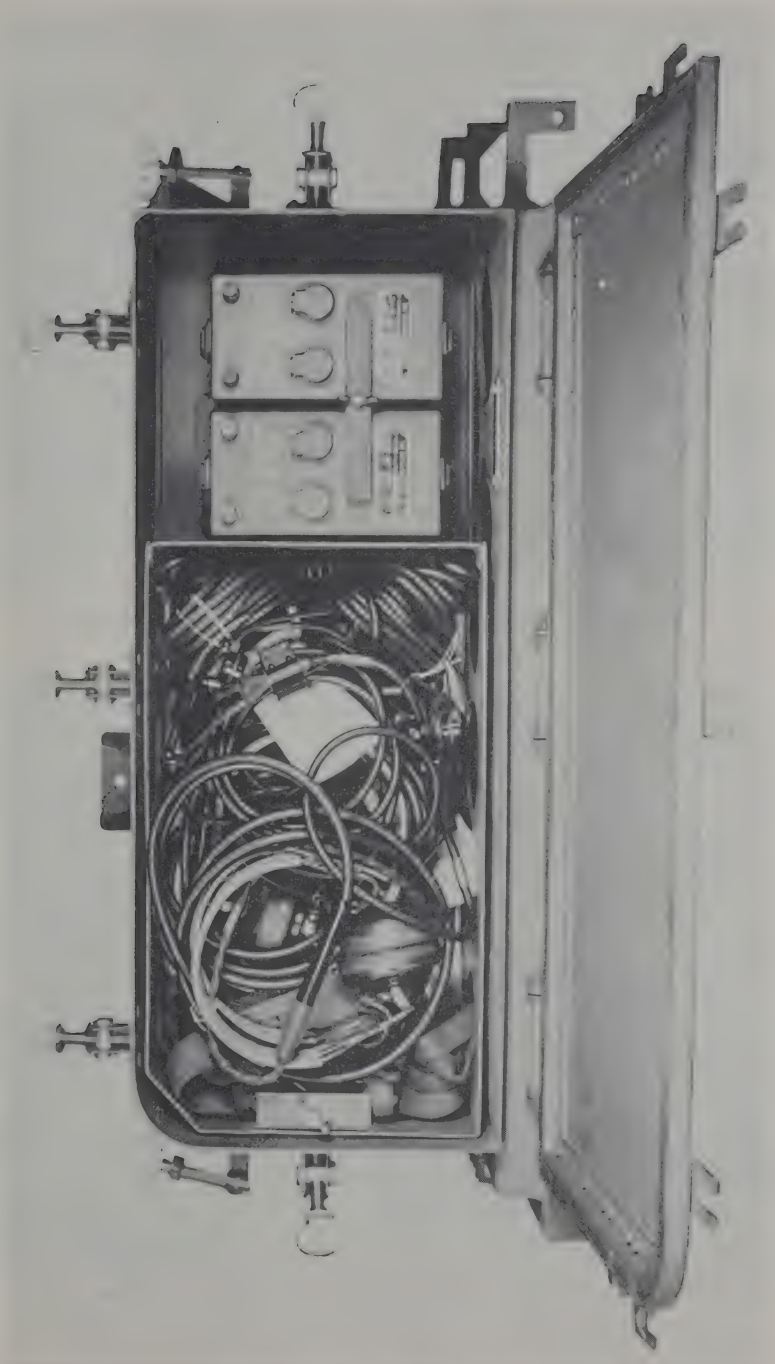


Figure 1-8. Right Wing Compartment, Upper.

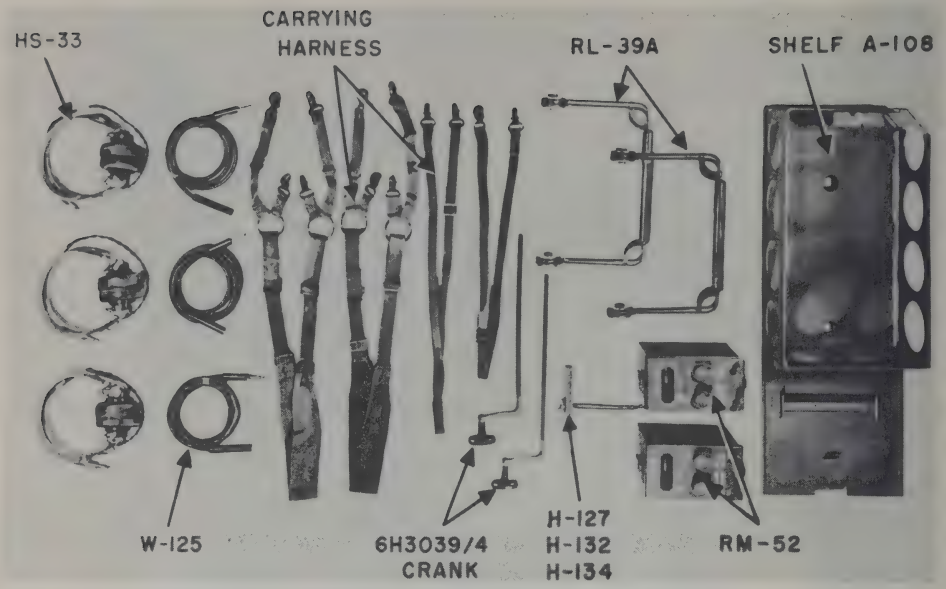


Figure 1-9. Right Wing Compartment, Upper Contents

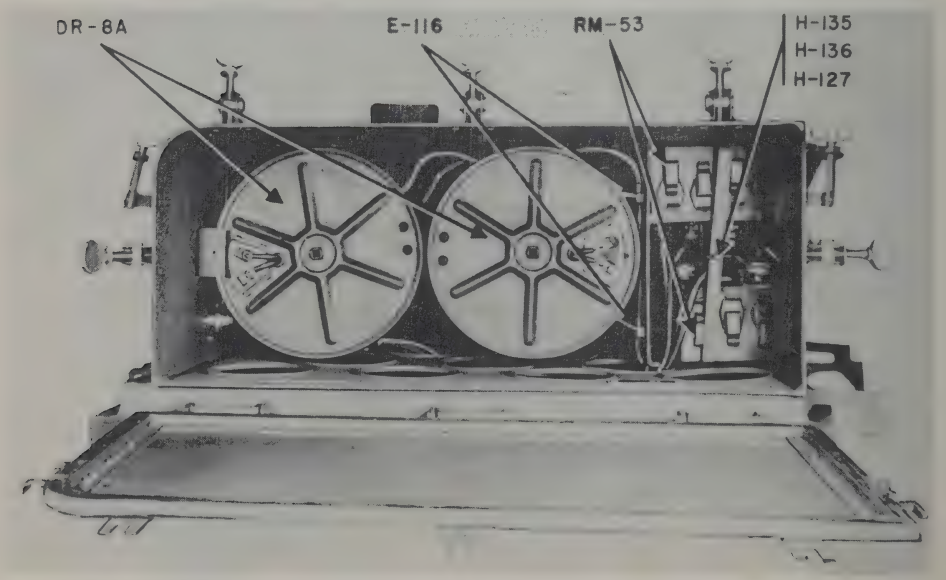


Figure 1-10. Right Wing Compartment, Lower

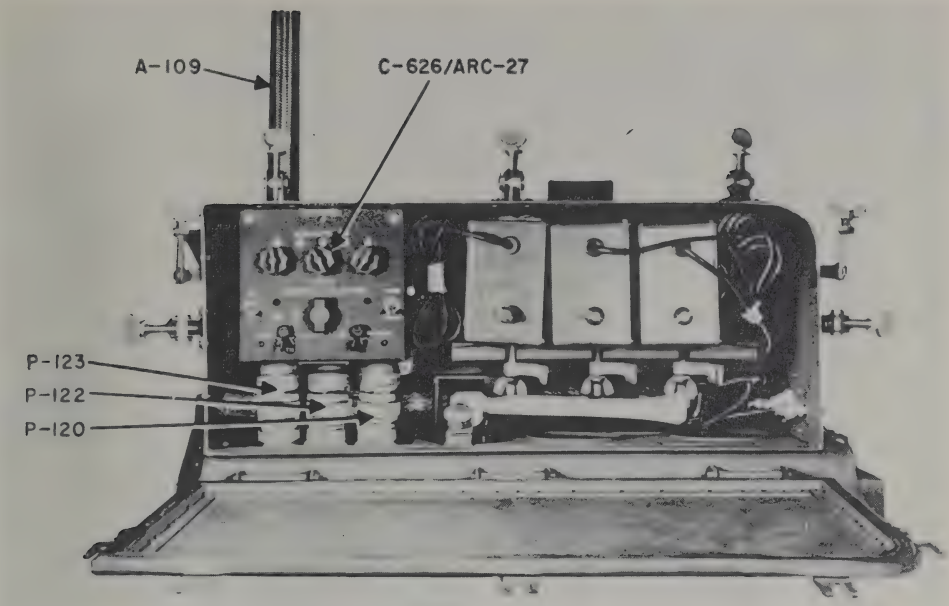


Figure 1-11. Left Wing Compartment, Upper

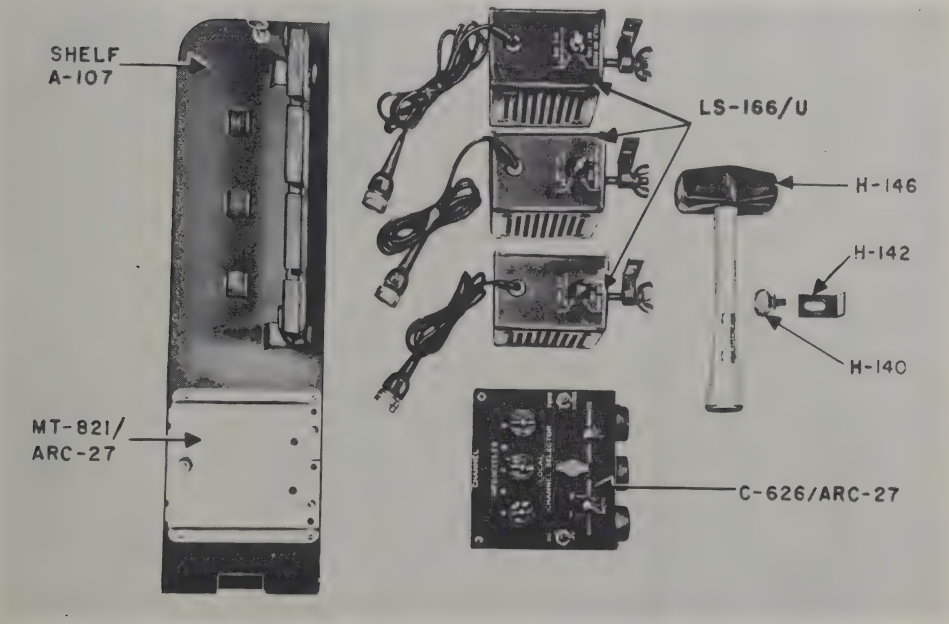


Figure 1-12. Left Wing Compartment, Upper Contents

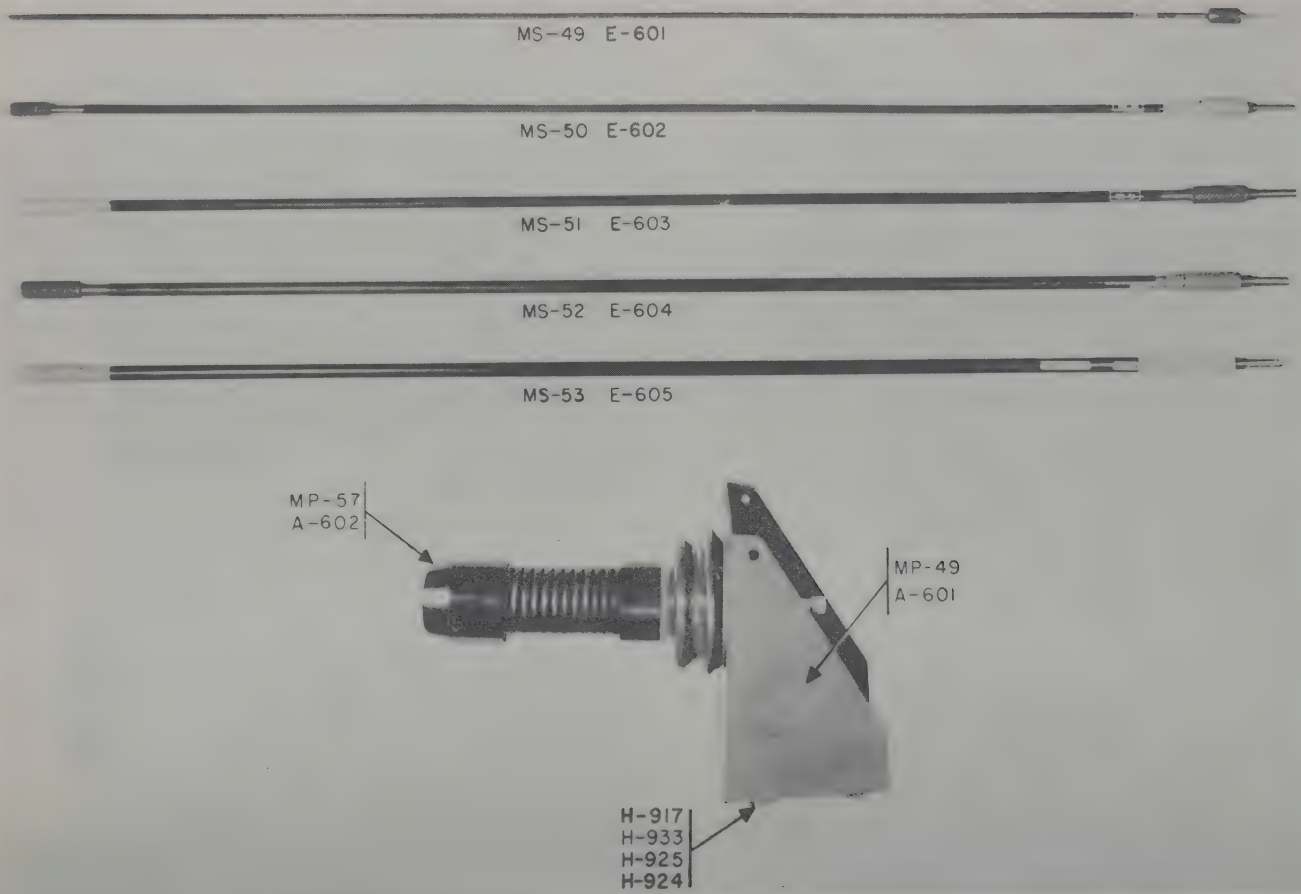


Figure 1-13. HF Antenna and Mounting

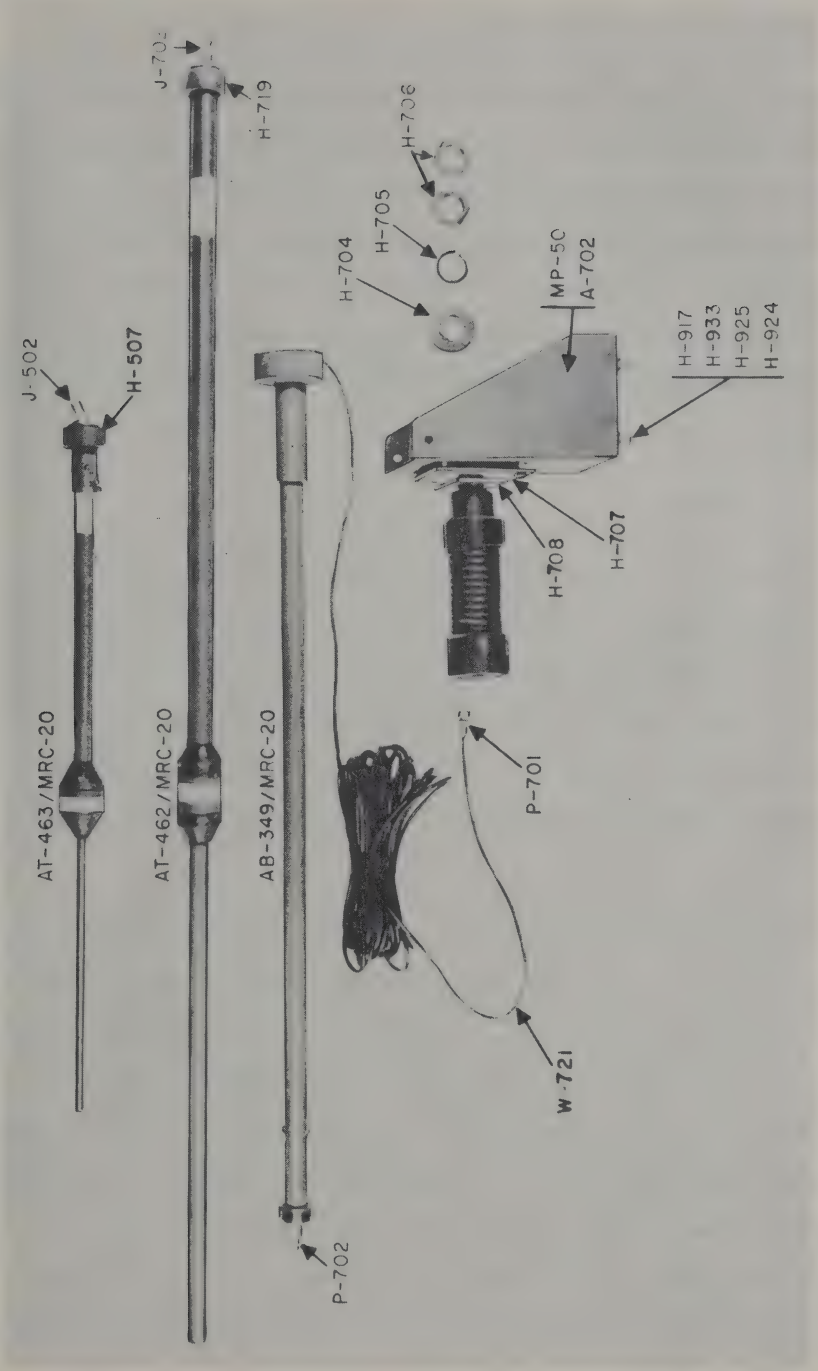


Figure 1-14. UHF Antenna AT-463/MRC-20, VHF Antenna AT-462/MRC-20 and Mast AB-349/MRC-20

is also a form of coaxial antenna similar in construction of the VHF antenna. The upper section is 10.437 inches long and 9.54 inches in diameter. It is fed in the same manner by 50 ohms impedance, RG-58C/U concentric cable which passes coaxially through the tubular telescopic mounting mast, see paragraph 1-22. The UHF antenna is matched to the line impedance of 50 ohms and functions as a broad band receiving and transmitting antenna in the range from 325 to 400 megacycles. It is used with the AN/ARC-27 system.

1-26. TELESCOPIC MAST.

1-27. GENERAL. The telscopic mast AB-348/MRC-20 (see figure 1-15) is a six section telescoping assembly carrying the UHF antenna and mounted on the rear corner of the vehicle. Retracted it is 6 1/2 feet long and extends to approximately 28 feet. It can be operated either manually or by motor drive. Its purpose is to increase the height and therefore the effective operating range of the UHF antenna. The VHF antenna may also be used.

1-28. DESCRIPTION. The telescopic mast is extended and retracted by a pair of cables wound on drums. The drums are normally driven by a gear and clutch system and a reversible 24 volt DC motor which is controlled by a two position switch mounted in a control box C-1328/MRC-20 (see figure 1-1, sheet 4,B) on the control panel. Two micro-switches act as limiting switches to stop motor operation at the extremes of travel. A hand crank emergency system is also provided. Insertion of the hand crank in its socket disengages the motor clutch and allows the cable drums to be crank driven and the mast to be elevated or lowered. The R-F cable feeding the

UHF antenna mounted on top of the mast is also wound on a drum coupled to the retracting drum by an idler gear to keep the R-F cable at constant tension during elevation and to take up the slack during retraction. A counter, also mounted in the control box, shows the extended position of the mast in feet and inches.

TABLE IV ELECTRICAL CHARACTERISTICS OF THE MAST DRIVE MOTOR

VOLTAGE	CURRENT	POWER	RPM	TYPE
24 VDC	6.8 Amp.	1/8 HP	2000	Delco Model A-4949

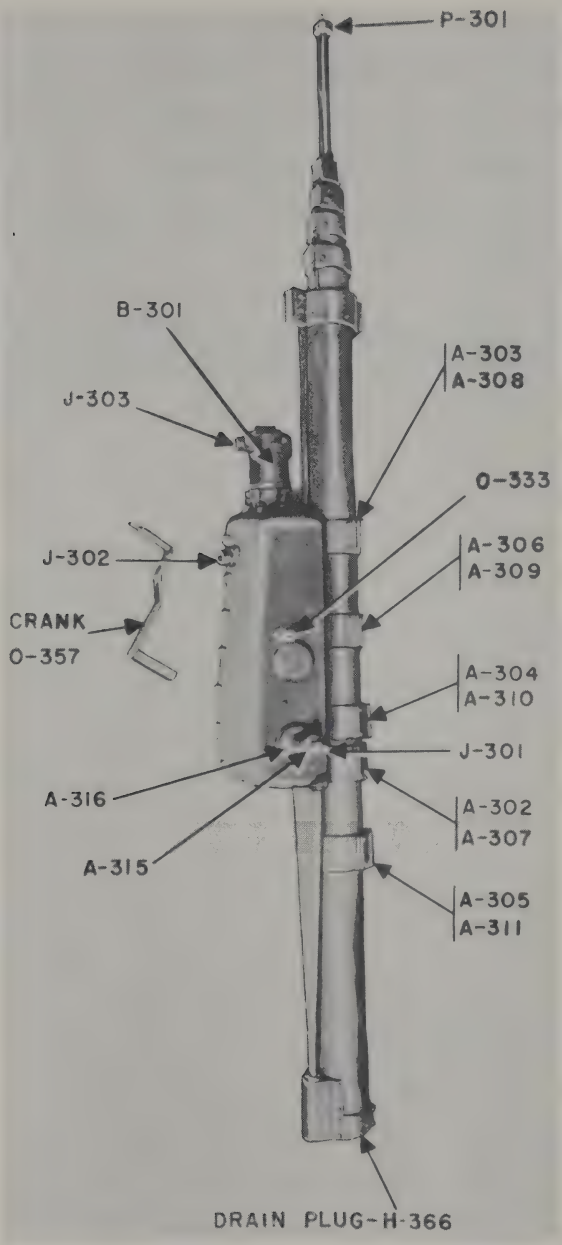


Figure 1-15. Telescopic Mast AB-348/MRC-20.

1-29. CONTROL GROUP PANEL.

1-30. The Control Group Panel MT-1335/MRC-20 (see figure 1-1, sheet 4,B) is located between the vehicle seats within easy reach of both occupants. It provides a mount for the following controls:

1-31. The C-118/ARC-3 and the C-197/ARC-3 (see figure 1-16) controls for the AN/ARC-3 Radio Set to provide transmitter frequency selection, receiver volume control and microphone and headphone input jacks.

1-32. The C-87/ART-13 control for the AN/ARC-8 Radio Set to provide transmitter frequency selection and microphone and headphone input jacks.

1-33. The C-628/ARC-27 control, for the AN/ARC-27 Radio Set to provide transmitter frequency selection, receiver volume control and, with the Jack Box J-579/MRC-20 (previously described), microphone and headphone input jacks.

1-34. The Remote Switching Control Unit C-1329/MRC-20 (see figure 1-17) to provide an OFF-ON switch for the retransmission Electronic Switch and selection for the pair of receiver-transmitter combination desired for repeater use. See figure 5-16 for the schematic diagram of this unit.

1-35. The Telescopic Mast Control C-1328/MRC-20 (see figure 1-18) to provide an up-down positioning control for the telescopic mast and an indicator showing the extended amount. The schematic diagram for the mast control is shown in figure 5-10.

1-36. POWER PLANT HRU-28A.

1-37. The HRU-28A Power Plant (see figure 1-1, sheet 3,A) consists of a single-cylinder air cooled two cycle gasoline engine governed for speeds between 3200 and 3700 rpm. directly connected to a direct current generator of 2000 watts rating at 28.5 volts to form an integral unit. It can be mounted on the top of the Electric Equipment Cabinet, in the trailer or in the M-37 vehicle as required. Shock mountings are furnished.

1-38. BATTERY SUPPLY.

1-39. The battery supply (see figure 3-2) consists of two 12 volt Auto-lite type 2HNR-US lead-acid type batteries BT-101 and BT-102 connected in series to give a 24 volt supply. Each battery is rated at 45 amp. hrs. Specific gravity at full charge should be between 1.270 and 1.280 at 80 F at indicated full level. The batteries are located in the right wing compartment in a double vented fiberglass battery case CY-1483/MRC-20 with removable fiberglass cover.

1-40. TRAILER MOUNTING KIT.

1-41. A mounting kit (see figure 3-1) is provided for mounting the HRU-28 Power Plant, a Fire Extinguisher and four 5 gal. gasoline cans in the trailer. This kit consists of Generator Mount MT-1338/MRC-20. Fire Extinguisher Mount MT-1340/G and four 5/16-18 by 1-1/2 in. hexagonal head bolts with nuts and lock-washers to hold the gasoline cans.

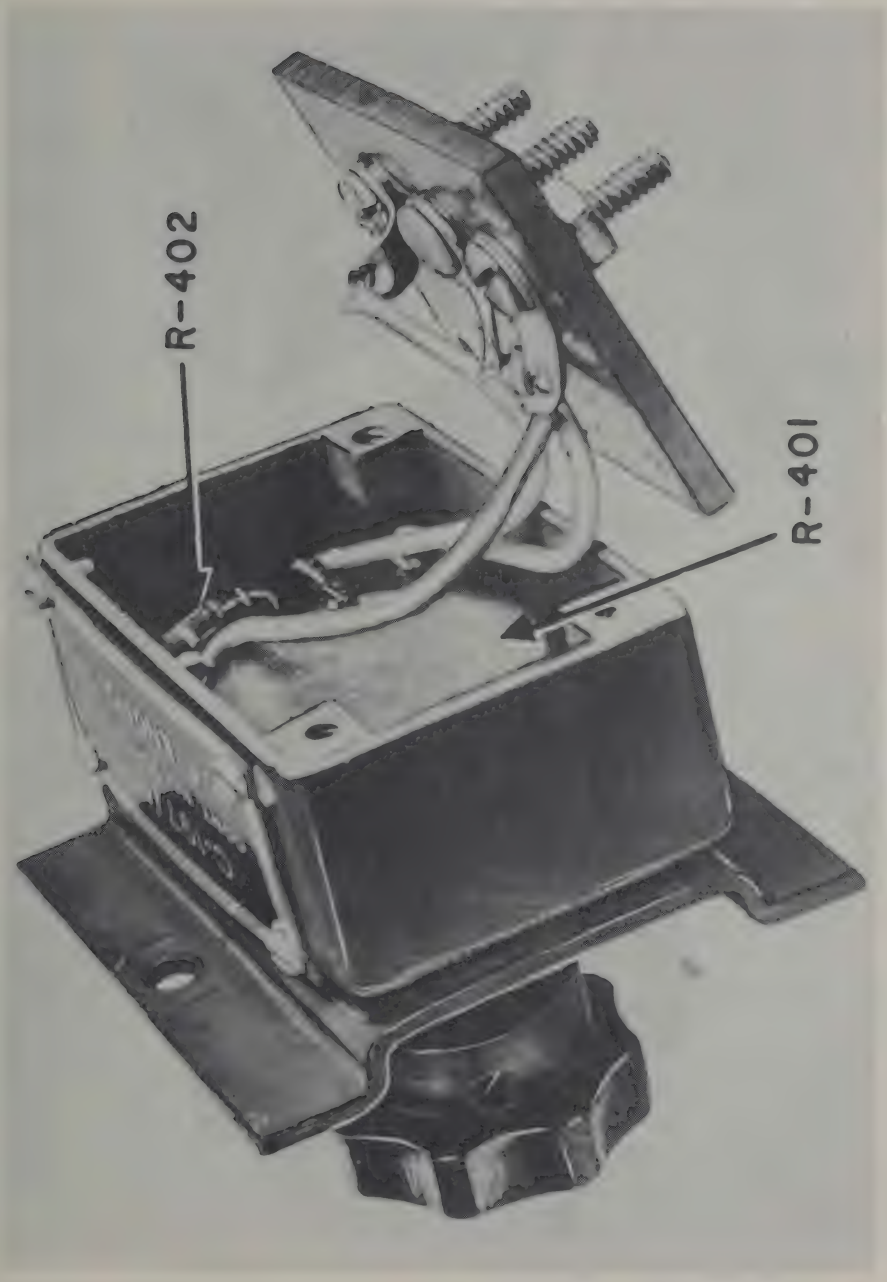


Figure 1-16. Control C-197/ARC-3.

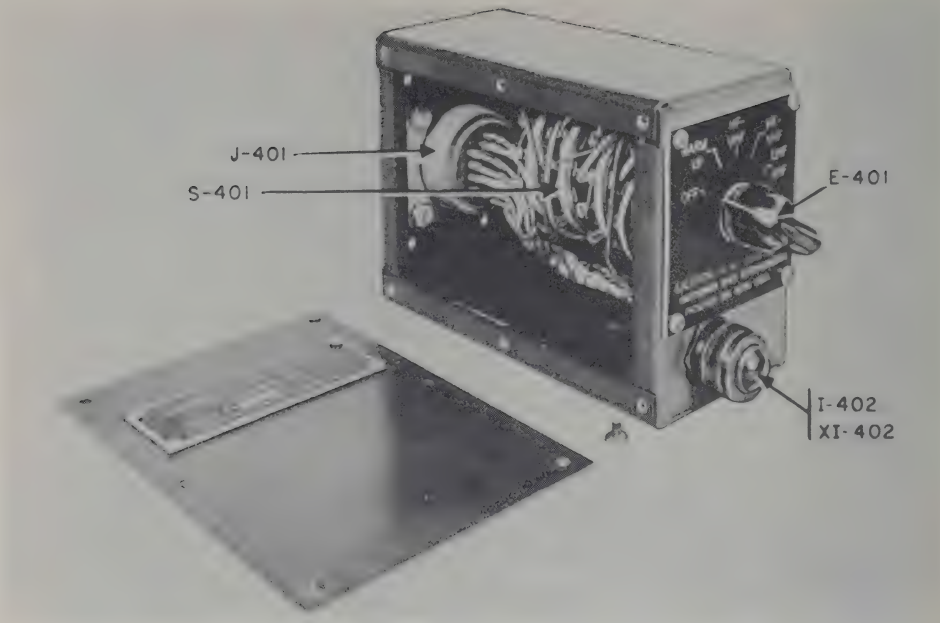


Figure 1-17. REMOTE Switching Control C-1329/MRC-20

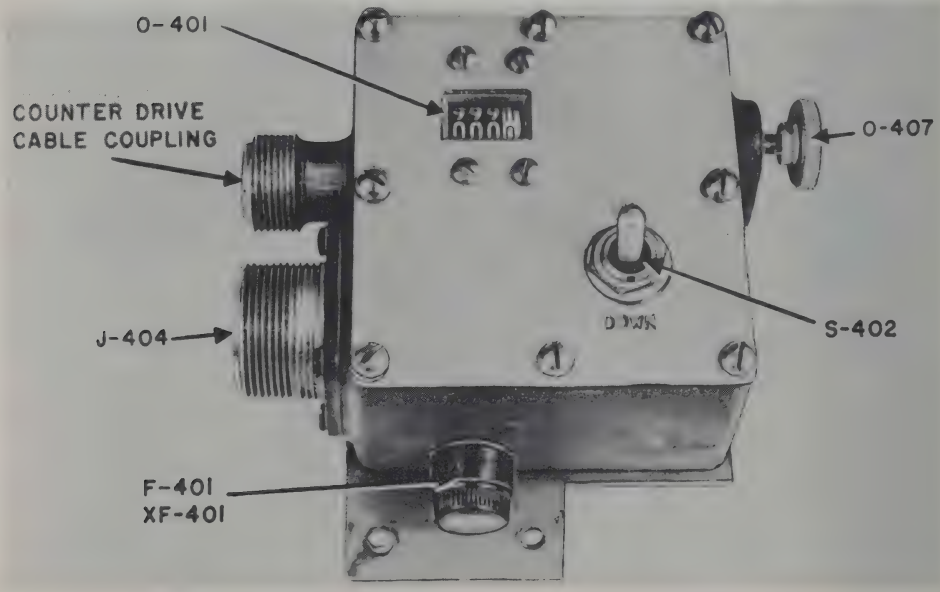


Figure 1-18. Telescopic Mast Control C-1328/MRC-20

1-42. M-37 TRUCK MOUNTING KIT.

1-43. A mounting kit MK-152/MRC-20 (see figure 3-6) is provided for mounting the AN/MRC-20 equipment in the M-37 3/4 ton, 4 by 4, truck. This kit includes mounting MT-1345/MRC-20 for the equipment cabinet; mounting MT-1361/MRC-20 for the control group, two mountings MT-1338/MRC-20 for the power plant; mounting MT-1348/MRC-20 for the spare tire; and mounting MT-1349/MRC-20 for the gasoline cans.

1-44. INTERCONNECTING CABLES.

1-45. A complete set of all interconnecting cables necessary for the operation of the equipment is included.

SECTION II

TEST EQUIPMENT AND SPECIAL SERVICE TOOLS

2-1 GENERAL. 1 No special test equipment of service tools are necessary.

SECTION III

PREPARATION FOR USE

3-1 UNPACK.

a. Open all crates and unpack equipment. Packing material may be discarded.

3-2 INSTALLATION OF AN/MRC-20 IN M-38 TRUCK.

3-3 ELECTRICAL EQUIPMENT CABINET CY-1482/MRC-20. (See figure 3-1).

a. Lift the cabinet CY-1482/MRC-20 by means of the handles located on the top and sides and place it in the rear of the M-38 truck.

b. Place rear hold bracket assembly A-907 into position, one on each side, the hooked end of the assembly engaging the channel on the truck wall and the threaded stud end engaging the rear mounting bracket on the side of the case. Secure with 3/8-16 hex nut H-913 and 3/8 lock-washer H-926.

c. Attach the front hold down brackets A-908 and A-909 to the front mounting brackets on each side of the equipment cabinet using two each 5/16-18 by 1-1/4 in. bolts H-916, lockwashers H-925 and hex nuts H-924. Tighten securely.

d. Attach the front hold down brackets to the truck wall using 5/16-18 by 3/4 in. bolts H-917, plain washers H-933, lockwashers H-925 at the tapped brackets in the truck wall. Tighten securely.

e. Connect Bonding Strap E-110 to GROUND stud.

3-4. CONTROL GROUP PANEL.

a. Place the control group panel MT-1335/MRC-20 complete with attached controls on the inside rails of the front seat of the truck with the

sloped section facing toward the rear (see figure 1-1, sheet 2).

b. Place the two provided U bolts H-941 around the inside rail of the occupants seat, engaging them with the two mounting brackets on the under side of the control panel. Secure with two each 6-32 hex nuts H-942 and lockwashers H-943.

c. Connect cables in accordance with Table V, Cable Installation.

3-5. POWER PLANT HRU-28A.

a. The HRU-28A Power Plant may be installed on the top of the Equipment Cabinet or in the truck trailer. The power cable W-112 is 25 feet long to allow the power plant to be moved away from the vehicle during operation if desired.

3-6. POWER PLANT ON THE EQUIPMENT CABINET.

a. Place the power plant on the four shock mounts located on the top of the cabinet and fasten with four 1/4-20 by 2-1/4 hex bolts H-914, plain washers H-902, lockwashers H-921 and 1/2 in. thick spacers H-904.

b. Fasten the exhaust tube A-943 to the power plant exhaust with the clamp H-944.

3-7. POWER PLANT IN THE TRAILER.

a. Drill four 1/2 in. holes in the trailer bed located as follows:- (1) one hole 27-3/8 in. back from the front trailer wall and 6 in. to the left of the center line in the trailer bed; (2) one hole 27-3/8 in. back from the trailer front wall and 10 in. to the left of the same center line; (3) one hole 50-3/8 in. back from the front trailer wall

and 6 in. to the left of the center line; (4) one hole 50-3/8 in. back from the front wall and 10 in. to the left of the center line.

b. Bolt the two mounting plates MT-1338/MRC-20 carrying the shock mounts A-903 through these holes using four 7/16-14 by 1-1/2in. bolts H-907, spacer blocks H-910, two lockwashers (one top and bottom) H-908 and nuts H-909.

c. Place the power plant on the shock mounts and secure with four 1/4-20 by 1/34 in. bolts H-912, plain washers H-902 and lockwashers H-921.

d. Fasten the exhaust tube A-943 to the power plant exhaust with the clamp H-944.

3-8. CABLE REEL RC-411/G IN THE TRAILER.

a. Drill four 1/2 in holes in the floor of the trailer located as follows:- (1) two holes 33-5/6 in. back from front trailer wall, one 6 in. and the other 10 in. to the right of the center line; (2) two holes 44-7/16 in. back from front trailer wall, one 6 in. and the other 10 in. to the right of the center line.

b. Bolt the Cable Reel RC-411/G through these holes using four 7/16-14 by 1-1/2 in. bolts H-907, spacer blocks H-910, two lockwashers (one top and bottom) H-908 and nuts H-909.

3-9. FIRE EXTINGUISHER MOUNT MT-1340/G IN TRAILER.

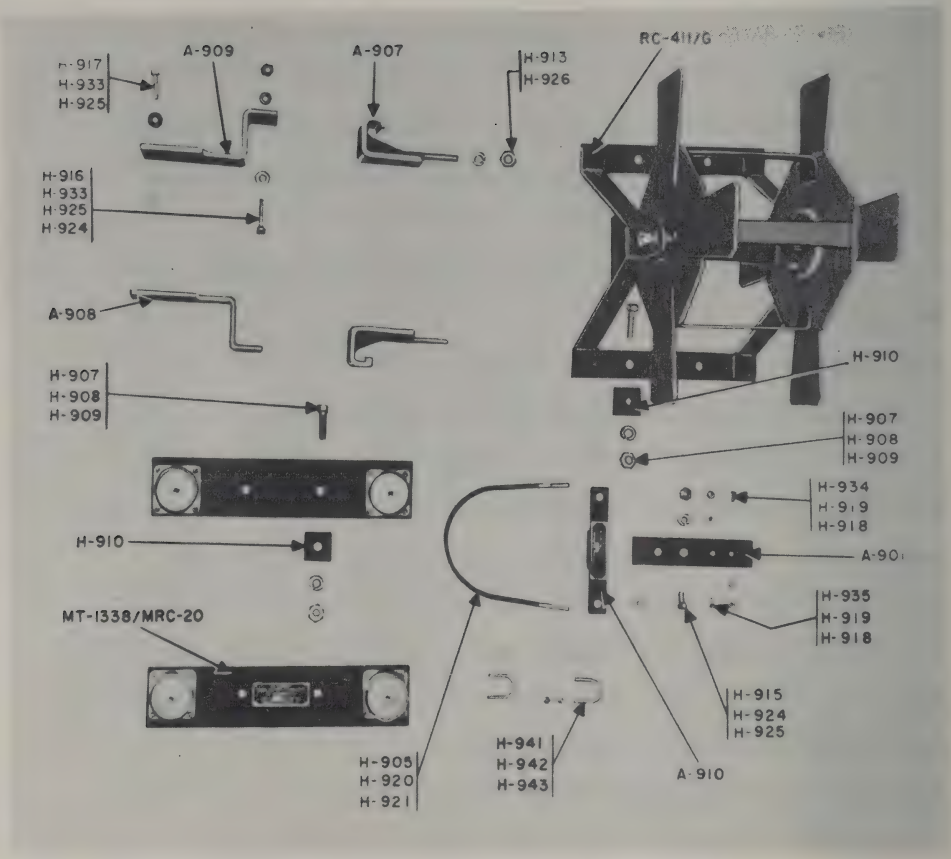


Figure 3-1. Installation Parts, M-38 Truck and Trailer.

a. Drill a 13/32 in. hole in the right wall of the trailer at a point 18 in. from the back wall and 7-14 in. above the trailer floor.

b. Drill a second 13/32 in. hole 1-1/2 in. directly above the first.

c. Drill a 9/32 in. hole in the right wall 15-3/16 in. from the back wall and 1-1/4 in. above the trailer floor.

d. Drill a second 9/32 in. hole 5-5/8 in. further away from the back wall and 1-1/4 in. above the trailer floor.

e. Bolt the top clip of the fire extinguisher mount to the mounting plate A-901, with the10-32 by 5/8 in. long binder head screw H-934, lockwasher H-919 and nut H-918 through the upper hole and the flat head 10-32 by 5/8 in. long screw H-935, lockwasher H-919 and nut H-918 through from the back to allow A-901 to lie flush against the trailer wall.

f. Bolt A-901 to the trailer wall at the holes drilled in step a. and b using two 5/16-18 by 1/2 in. long bolts H-915, lockwashers H-925 and nuts H-924.

g. Snap the Fire Extinguisher into its clip and place the U bolt H-905 around its base, through the spacer assembly A-910 placed between it and the trailer wall and then through the two holes drilled in steps c. and d. Secure with nuts H-920 and lockwashers H-921.

3-10 GASOLINE CANS IN THE TRAILER.

a. Locate and drill four 3/8 in. holes each in the front and rear walls of the trailer as follows:- (1) one hole 4-5/8 in. each side of the center line and 4-1/2 in. above the top surface of the channels in the trailer floor; (2) one hole 10-3/8 in. each side of the center

line and the same distance above the floor.

b. Bolt the gasoline can holders through these holes using 5/16-18 by 1-1/2 in. bolts H-911, nuts H-924 and lockwashers H-925.

3-11. STORAGE BATTERIES 2HNR-US IN EQUIPMENT CABINET. (See figure 3-2.)

a. Fill the two batteries BT-101 and BT-102 up to the indicated fill line with the electroyte packed in separate container. Batteries are in charged condition. State of charge may be checked by following paragraph:

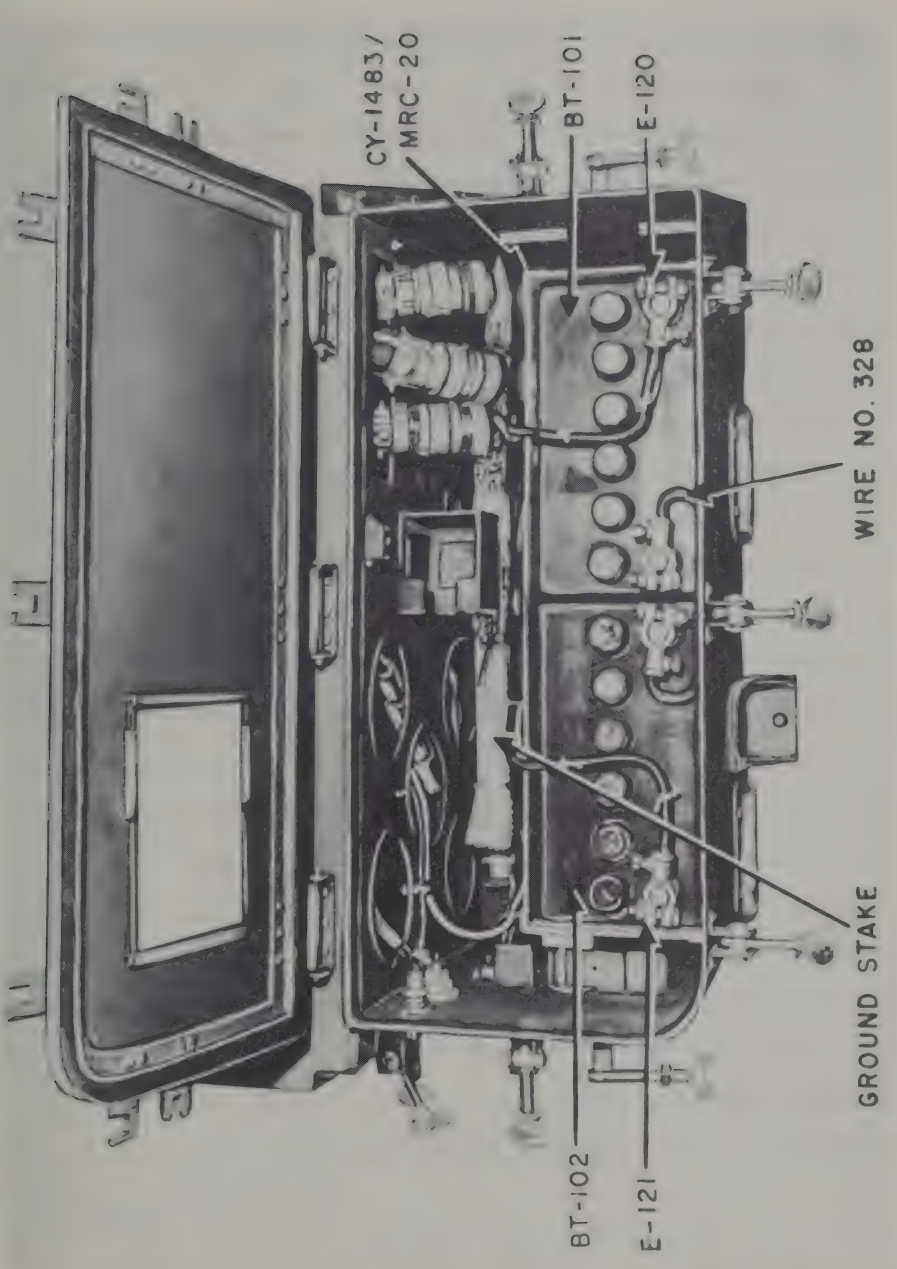


Figure 3-2. Left Wing Compartment.

b. Loosen wing cover thumb screws and raise cover.

c. Remove the three plugs P-120,P-122 and P-123 from the C-626/ ARC-27 control unit.

d. Loosen shelf hold down thumb screw and remove shelf.

e. Remore fiberglass battery box cover A-111.

f. Place the two 2HNR-US batteries, BT-101 and BT-102, into the fiberglass battery box CY-1483/MRC-20 with the negative terminal of one nearest the rear of the wing compartment and the positive terminal of the other near the front of the wing compartment.

g. Connect the positive terminal of the other (batteries in series) with the provided jumper wire No. 328 and two battery clamps D-109.

h. Connect the other positive terminal to the battery clamp E-120 which is connected to wires No. 323 and No. 325 and is located near the front of the compartment. These wires enter the battery box through a slot in the wall.

i. Connect the other negative terminal to the battery clamp E-121 which is connected to wires No. 322 and No. 326 and is located near the rear of the compartment. These wires also enter the battery box through a slot in the wall.

j. Replace the battery cover.

k. Replace shelf and fasten with thumb screw.

l. Connect the three cable plugs P-120, P-122 and P-123 to the receptacles on the C-626/ARC-27 unit and tighten. These plugs will only mate with their proper receptacles.

m. Close cover and fasten down thumb screws.

3-12. HF ANTENNA. (See figures 1-1 and 1-13.)

a. Using the short side of the MP-49 antenna mounting bracket A-601 as a template and locating it flush with the top of the right rear section of the M-38 truck and 2-1/2 in. in from the tail gate edge (directly above the rear right tail light) drill the four 3/8 in. mounting holes.

b. Bolt the short side of the MP-49 mount through these holes to the truck using four 5/16-18 by 3/4 in. bolts H-917, lockwashers H-925, plain washers H-933 and nuts H-924. Fasten the other end of E-110 installed in paragraph 3-3, step e. under one of these nuts.

c. Insert the MP-57 antenna mount A-602 into the hole in long side of the MP-49 base and secure with the MP-57 lockwashers H-604 and nuts H-605.

d. Assemble the antenna sections MS-49, MS-50, MS-51, MS-52 and MS-53 (E601 thru E-605) and attach them to the MP-57 mount. See cable installation Table Y for cable connection.

3-13. VHF ANTENNA. (See figures 1-1 and 1-14.)

a. Using the short side of the MP-50 antenna mounting base A-702 as a template and locating its lower edge 3 in. above the right running board and its rear edge 4 in. in from the rear end of the running board (just back of the right front fender) drill four 3/8 in. mounting holes.

b. Drill a 1 in. hole centered with the large hole in the MP-50 base.

c. Bolt the short side of the MP-50 base through these holes using four 5/16-18 by 3/4 in. long bolts H-917, plain washers H-933, lockwashers H-925 and nuts H-924.

d. Bolt the base adapting plate H-707 to the long side of the MP-50 base using four 5/16-18 by 3/4 in. bolts H-917, lockwashers H-925 and nuts H-924.

e. Feed the free cable end extending from the stud of the base section of the antenna mast AB-349/MRC-20 through the square washer H-708 and the hole in the adapting plate H-707.

f. Slide the plain washer H-704, lockwasher H-705 and two hex nuts H-706 onto the cable in that order.

g. Place the antenna mast stud in the hole in the base adapting plate and secure with the hardware placed on cable in step f.

h. Place the split grommet H-717 on the cable and feed the cable end thru the 1 inch hole into the body of the truck and out to the VHF receptacle J-109 on the equipment cabinet (see cable installation Table V below).

i. Fit grommet H-717 into the 1 inch hole.

j. Engage the connector P-702 at the top of the mast with the connector J-702 in the VHF antenna AT-462/MRC-20. (The UHF antenna AT-463/MRC-20 may be used if desired.)

k. Couple the VHF antenna to the mast and tighten the coupling nut H-719.

3-14. TELESCOPIC MAST AND UHF ANTENNA.
(See figure 3-3.)

a. Bolt one leg of the lower mounting brace A-927 to the inside of the lower left end of the rear frame cross member of the truck, aligning

Figure 3-3. Telescopic Mast Mounting Parts for M-38 Truck

the end hole in A-927, with the existing hole in the cross member, using a 5/16-18 by 3/4 in. long bolt H-917, lockwasher H-925 and nut H-924. The other leg of the brace should be parallel to and along the rear fender.

b. Level the mounting brace and drill an 11/32 in. hole in the cross member located by the second hole in the mounting brace. Bolt with a 5/16-18 by 3/4 in. long bolt H-917, lockwasher H-925 and nut H-924. Tighten both bolts securely.

c. Bolt the tie-in bracket A-928 to the other leg of the mounting brace A-927 through the lower two holes in the mounting brace, using 5/16-18 by 1-1/4 in. long bolts, lockwashers and nuts, H-916, H-925 and H-924. The bend in the tie-in bracket should be toward the truck wall.

d. Slide the bracket mounting A-929 between the upper end of the tie-in bracket and the truck wall so that the center four holes of the eight hole group in the bracket mounting align with the four holes in the upper part of the tie-in bracket and the other bracket leg is flush against the rear wall of the truck.

e. Drill four 11/32 in. holes in the truck side wall located by the four common holes in the tie-in bracket-bracket mounting combination. Two 5/16-18 bolts may be temporarily inserted in two of these holes and hand tightened to hold the bracket mounting in place.

f. Drill three 11/32 in. holes in the truck rear wall located by the three holes in the bracket mounting. Bolt the bracket mounting to the rear wall using three 5/16-18 by 3/4 in. bolts, lockwashers and nuts, H-917

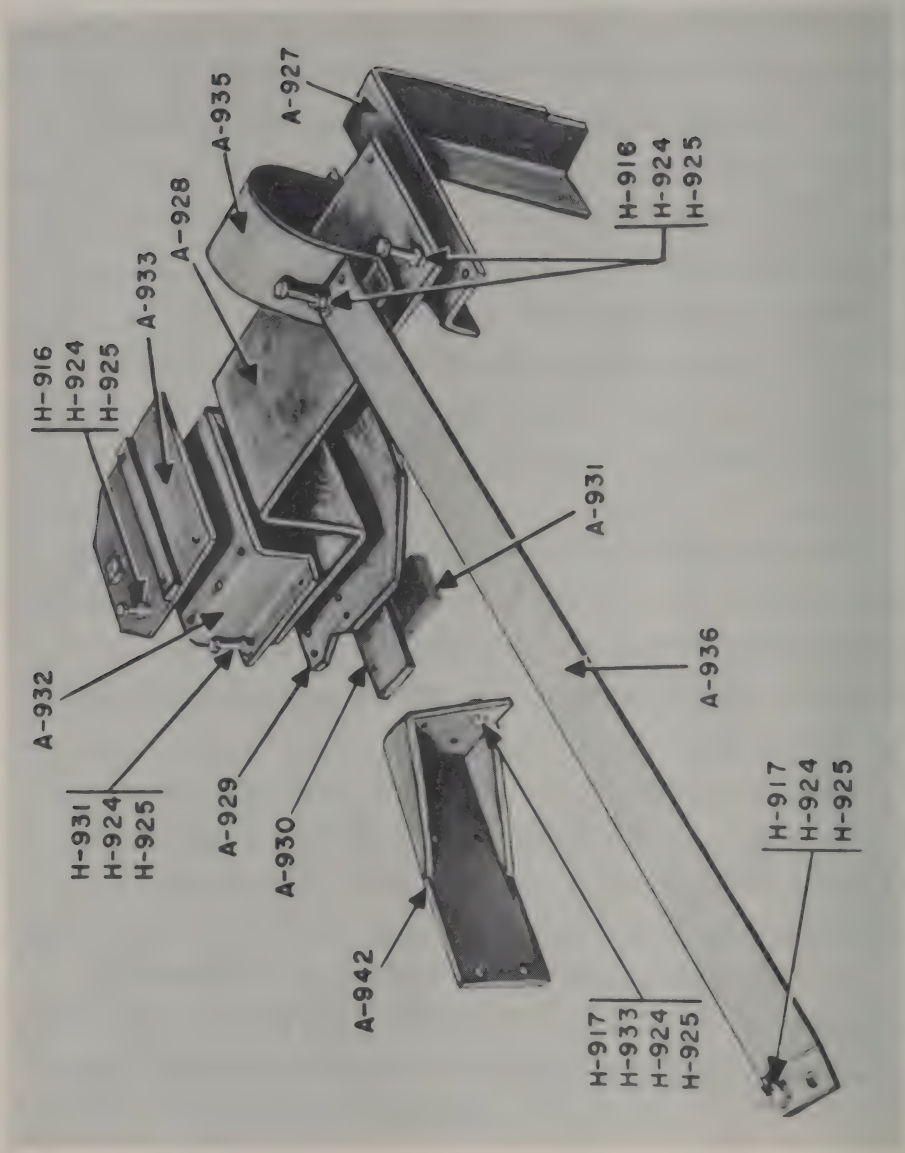


Figure 3-3. Telescopic Mast Mounting Parts for M-38 Truck.

H-925 and H-924.

g. Drill the four 11/32 in. holes in the truck side wall located by the outer four holes in the eight hole group in the bracket mounting.

h. Remove the bolts temporarily inserted in step c. and place the stiffener A-930 behind the truck wall and in line with the top row of four holes in the bracket mounting. Insert 5/16-18 by 2 in. long bolts H-931 through the center row of these holes and secure with lockwasher H-925 and nut H-924. These bolts should go through the tie-in bracket A-928, the bracket mounting A-929, the truck wall and the stiffener A-930, in that order.

i. Place the stiffener assembly A-931 behind the lower row of four holes in the bracket mounting by reaching up in under the wheel well. Bolt A-928, A-929, the truck wall and A-931 together with two 5/16-18 by 2 in. long bolts, lockwashers and nuts, H-931, H-925 and H-924, through the center two holes of the lower row.

j. Bolt the mounting plate A-932 to the outer four holes in the bracket mounting using 5/16-18 by 2 in. long bolts, lockwashers and nuts, H-931, H-925 and H-924. These bolts should go through A-932, A-929, the truck wall, the top two through A-930 and the bottom two through A-931.

k. Bolt the stationary plate A-933 to the mounting plate, using four 5/16-18 by 1-1/4 in. long bolts, lockwashers and nuts, H-916, H-925 and H-924, with the 1/2 in. hole at the top.

i. Insert the 1/2-13 shoulder bolt H-937 in the 1/2 inch hole in the angle support assembly A-934 (see figure 3-7) and then bolt A-934 to the telescopic mast assembly at the two collars, A-302 and A-303, using a spacer H-940 and four 1/4-20 by 1 in. long bolts H-929, lockwashers H-921 and nuts H-920 at each collar.

m. Bolt this assembly to the stationary plate A-933 with the shoulder bolt H-937, lockwasher H-938 and nut H-939 at the top hole and two 3/8-16 by 3/4 in. bolts H-936 and lockwashers H-926 at the two tapped holes.

n. Place the lower mounting collar A-935 over the foot of the mast assembly in line with the upper five of the seven holes in the lower section of the tie-in bracket installed in step c. and bolt with three 5/16-18 by 1-1/4 in. bolts, lockwashers and nuts, H-916, H-925, H-924, one in the top hole of the four group and two in the top two holes of the three group. Tighten securely.

o. Bolt one end of the bracket A-936 which goes across the wheel, to the middle two holes in the four group of the tie-in bracket using 5/16-18 by 1-1/4 in. bolts, lockwashers and nuts, H-916, H-925 and H-924. These bolts should also go through the lower mounting collar A-935.

p. Using the holes in the other end of the bracket A-936 to locate points, drill two 11/32 holes in the fender.

q. Bolt A-936 to the fender using two 5/16-18 by 3/4 in. long bolts,

lockwashers and nuts, H-917, H-925 and H-924.

r. Connect cable W-114 and W-122 (see Table V cable installation, below).

s. Connect the height counter drive cable O-385 from its coupling O-333 on the mast to its coupling on the Control Group Panel.

t. Engage the connector P-301 at the top of the mast with the connector J-502 in the UHF antenna AT-463/MRC-20. The VHF antenna AT-462/MRC-20 may be used if desired.

u. Couple the UHF antenna to the mast and tighten the coupling nut H-507.

3-15. TELESCOPIC MAST REST SUPPORT A-942.

a. Remove the lower mounting collar A-935 installed in paragraph 3-16,step n.

b. Remove the two 3/8-16 by 1 in. bolts H-936 installed in paragraph 3-16, step m.

c. Position the rest support A-942 in the space on the truck body above the gasoline filler pipe (see figure 1-1) approximately 2-3/4 in. forward of the truck top frame support bracket and as close to the upper edge as possible. Rotate the mast forward and check to see if the location chosen will allow A-942 to clear the top mast collar and the mast to rest in a near horizontal position. Readjust the location slightly until this condition is reached.

d. Locate the four mounting holes and drill with 3/8 in. drill. Mast may be returned to its vertical position to get it out of the way.

e. Bolt A-942 to the truck body using four 5/16-18 by 3/4 in. long bolts H-917, plain washers H-933, lockwashers H-925 and nuts H-924.

3-16. INSTALLATION OF AN/MRC-20 IN M-37 TRUCK.

a. Remove the spare tire and fold back and secure the wooden seats (see figures 3-4, 3-5 and 3-6).

b. Mount the AN/MRS-20 equipment in the M-37 truck in the following sequence.

3-17. FORWARD GASOLINE CAN HOLDERS, Reference line-center of truck bed.

a. Drill eight 7/16 holes located as follows:-(1) one hole 4-3/4 in. back from front body wall and 21 in. to the right of the reference line; (2) one hole 4-3/4 in. back and 27-1/8 in. to the right; (3) one hole 4-3/4 in. back and 18-1/4 in. to the left; (4) one hole 4-3/4 in. back and 24-3/8 in. to the left; (5) locate four holes in the same manner but 8 in. back from the front body wall.

b. Bolt two gasoline can holders, one in each corner using 5/16-18 by 1-1/4 in. bolts H-916, lockwashers H-925, nuts H-924 and spacers H-906, as needed, through the holes drilled in step a.

c. Fasten the gasoline cans to holders in the customary manner.

3-18. PLATFORM ASSEMBLY MT-1345/MRC-20 FOR THE ELECTRICAL EQUIPMENT CABINET. Reference line - center line of truck bed.

a. Drill two 7/16 in. holes located as follows:- (1) one hole 11-1/4 in. back from the front wall and 16-3/4 in. to the left of the reference line; (2) one hole 11-1/4 in. back and 19-1/32 in. to the right of the reference line.

b. Place the Platform Assembly MT-1345/MRC-20 in place using holes bored in step a. to locate the front end of the assembly. The front is the one with the projecting ends.

c. Bolt in place with two 5/16-18 by 2 in. bolts H-931, lockwashers H-925, nuts H-924 and 1-1/2 by 1-1/2 by 3/8 in. spacers as needed.

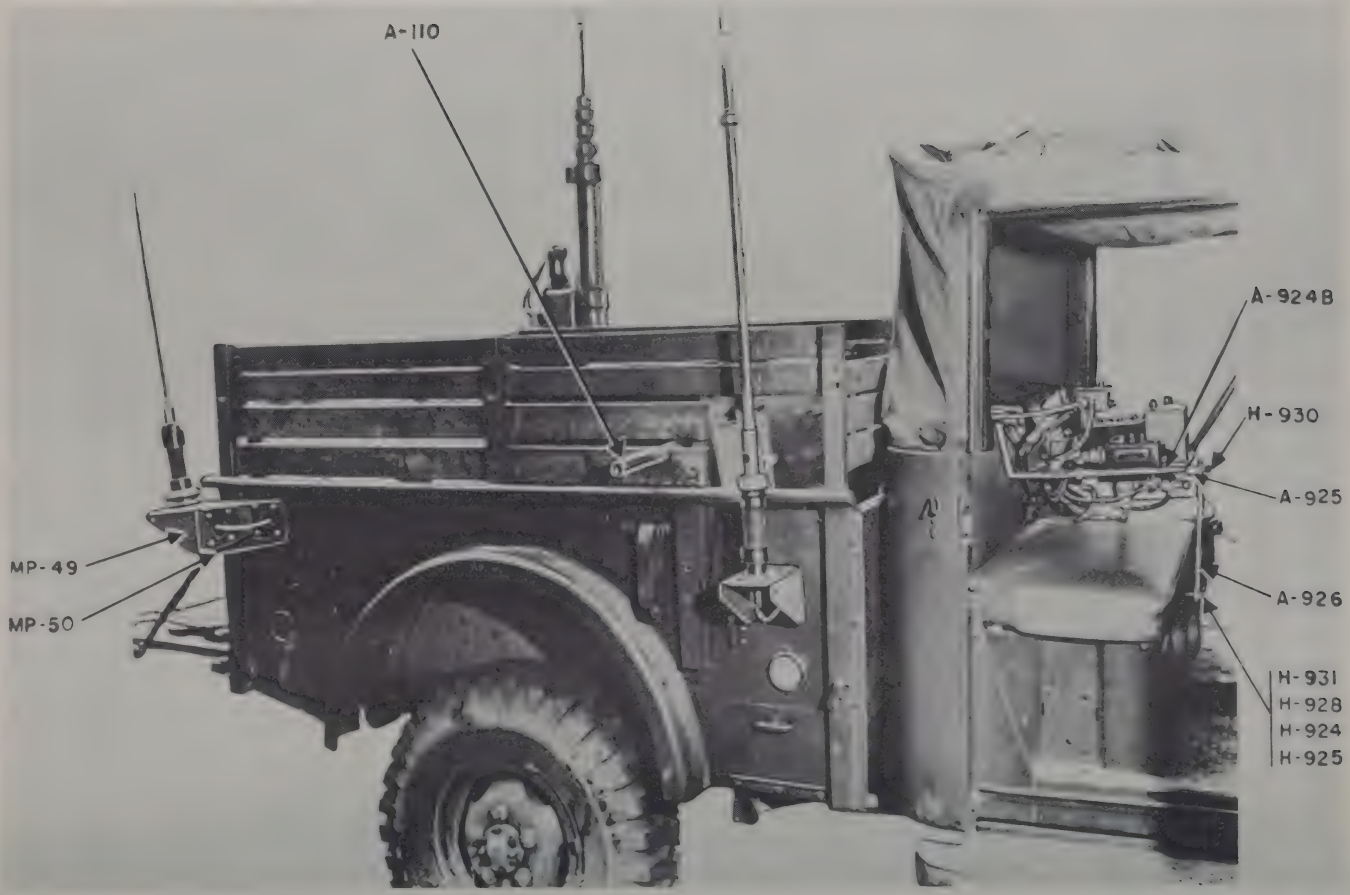


Figure 3-4. AN/MRC-20 Mounted in M-37 Truck, Right Side

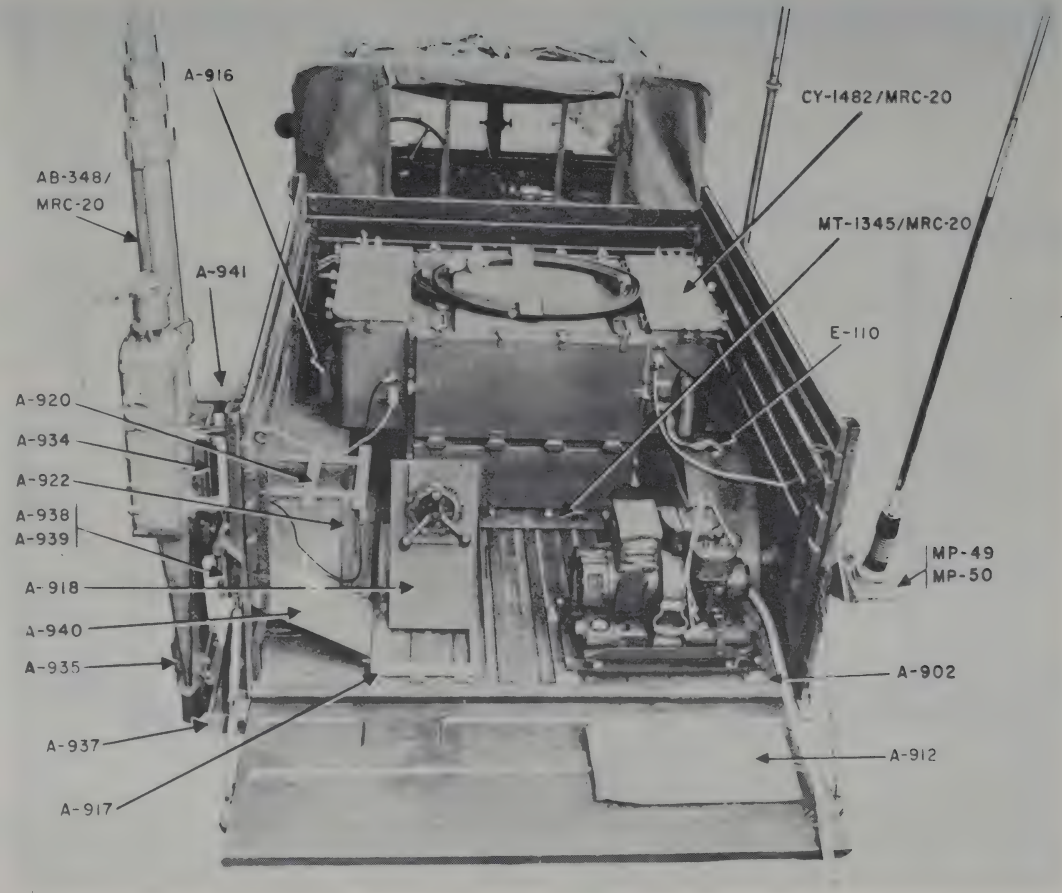


Figure 3-5. AN/MRC-20 Mounted in M-37 Truck, Rear View

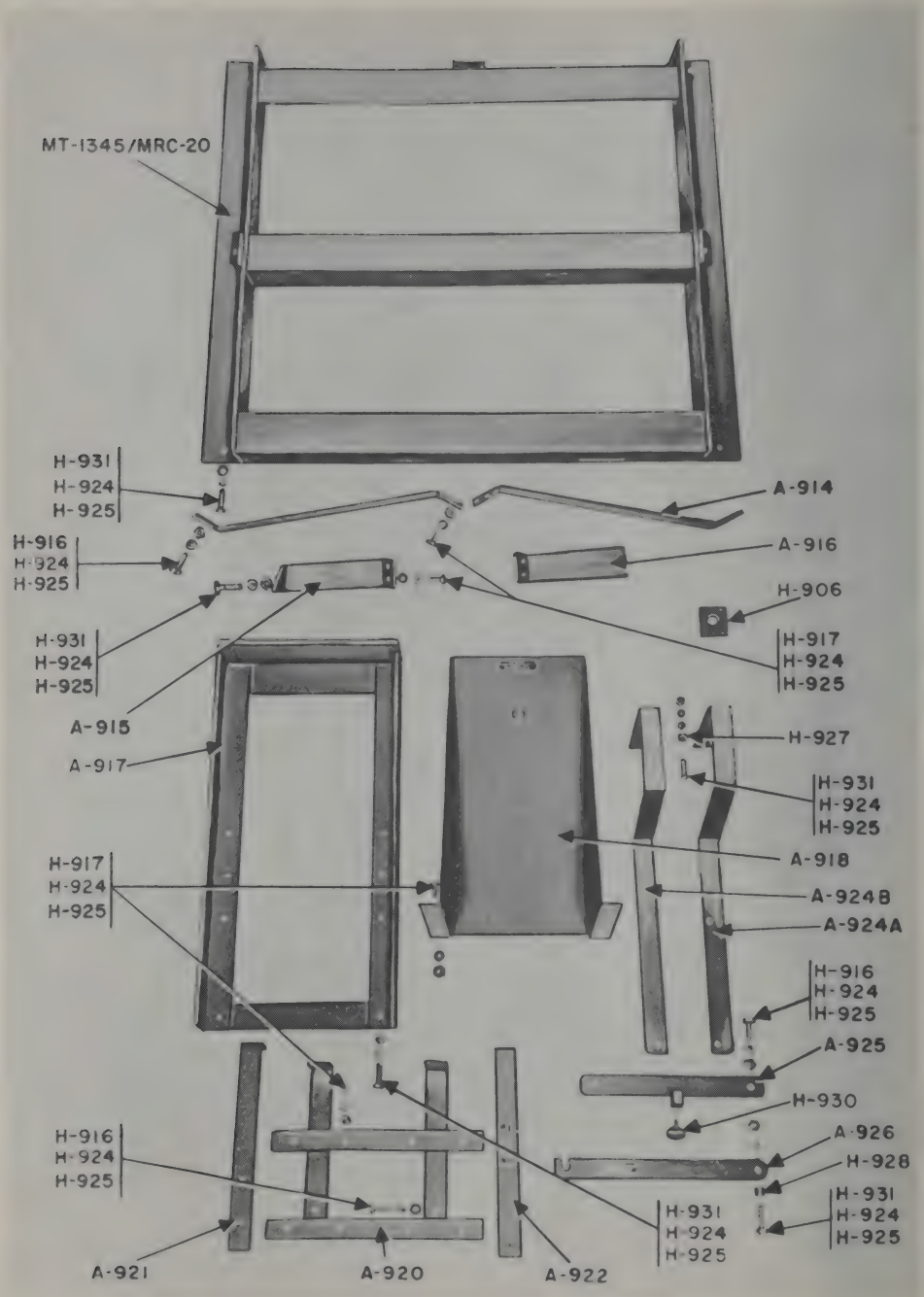


Figure 3-6. Mounting Parts for M-37 Truck

d. Using the platform assembly as a template, drill the remaining four holes and bolt to truck bed using same size bolts, lockwashers and nuts as in step c, with spacers, if needed.

3-19. EQUIPMENT CABINET ON PLATFORM.

a. Temporarily remove the intake vent tube A-110.

b. Place the Equipment Cabinet on the Platform Assembly so that it fits within the locating stops.

c. Bolt the two hold-down arms A-914 from the front brackets on the Equipment Cabinet to the tapped holes on the Platform Assembly using 5/16-18 by 1-1/4 in. long bolts H-916, lockwashers H-925, and nuts H-924 at the brackets and 5-16/18 by 3/4 in. long bolts H-917, lockwashers H-925 at the Platform Assembly.

d. Temporarily install the right and left rear holddown brackets A-915 and A-916 to the rear brackets on the equipment case with 5/16-18 by 2 in. long bolts H-931, lockwashers H-925 and nuts H-924 and use these to locate the holes in the right and left wheel wells.

e. Drill 7/16 in. holes as located in step c., and complete the installation of the hold-down brackets using 5/16-18 by 3/4 in. long bolts H-917, lockwashers H-925 and nuts H-924 through the bracket and wheel well.

f. Cut a hole in the truck side wall to allow A-110 to protrude through the wall and re-install A-110.

g. Connect the bonding strap E-110 to the GROUND stud.

h. Locate and drill a 3/8 in. hole in the wheel well at the other end of E-110.

i. Bolt E-110 to the wheel well using a 5/16-18 by 3/4 in. bolt H-917, lockwasher H-925 and nut H-924.

3-20. REAR GASOLINE CAN SUPPORT. Reference line - vertical center line of the left wheel well.

a. Drill five 7/16 in. holes located as follows:- (1) one hole through the wheel well wall, 12 in. back from the reference line and 2 in. up from the truck bed ; (2) one hole through the wheel well wall, 12 in. back from the reference line and 5 in. up from the truck bed; (3) one hole through the truck wall, 12 in. back from the reference line and 15 in. up from the truck bed; (4) one hole through the wheel well wall, 20 in. back from the reference line and 1 in. above the truck bed; (5) one hold through the truck wall, 20 in. back from the reference line and 15 in. above the truck bed.

b. Bolt the right hand Leg Assembly, A-921, to the wheel well wall at the first two holes drilled in step a, using two 5/16-18 by 3/4 in. long bolts, H-917, lockwashers, H-925, and nuts, H-924.

c. Bolt the left hand Leg Assembly, A-922, to the wheel well at the fourth hole drilled in step a, using a 5/16-18 by 3/4 in. long bolt, H-917, lockwasher, H-925, and nut, H-924.

d. Bolt the Support Assembly, A-920, for the gasoline cans to the top of these legs using two 5/16-18 by 1-1/4 in. bolts, H-916, lockwashers, H-925, and nuts, H-924, and to the truck wall at the third and fifth holes drilled in step a, using two 5/16-18 by 3/4 in. bolts, H-917, plain washers, H-933, lockwashers, H-925, and nuts, H-924.

e. Bolt the gasoline can holders placed back to back, to the Support Assembly, A-920, using eight 5/16-18 by 3/4 in. bolts, H-917, lockwashers, H-925, and nuts, H-924.

f. Bolt the gasoline can holders together using two 5/16-18 by 3/4 in. bolts, H-917, lockwashers, H-925, and nuts, H-924.

g. Mount the gasoline cans in the holders in the customary manner.

3-21. SPARE TIRE MOUNTING MT-1348/MRC-20.

a. Bolt the spare tire support assembly A-918 to the base assembly A-917 using six 5/16-18 by 3/4 in. bolts H-917, lockwashers H-925 and nuts H-924. These bolts should enter from the bottom and the flat side of A-918 should face short end of A-917. This forms the MT-1348/MRC-20 spare tire mounting.

b. Position the spare tire mounting in the left rear region of the truck bed so that the two holes in the vertical back piece align with the two holes backed up with welded nuts in the equipment cabinet platform assembly A-913.

c. Bolt the spare tire mounting to A-913 using two 5/16-18 by 3/4 in. bolts H-917 and lockwashers H-925.

d. Drill 7/16 in. holes through the truck bed at the points located by the two remaining holes in A-917.

e. Bolt the spare tire mounting to the truck bed at these holes with two 5/16-18 by 2 in. bolts H-931, lockwashers H-925 and nuts H-924. Use spacers H-906 to fill if necessary.

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3-22. POWER PLANT MOUNTS MT-1338/MRC-20.

a. Drill four 7/16 in. holes located as follows:- (1) one hole 7 in. toward the front from rear end of the truck bed and 4 in. in from the right wall; (2) one hole 11 in. toward the front and 4 in. from the right wall; (3) one hole 11 in. toward the front and 27 in. from the right wall; (4) one hole 11 in. toward the front and 27 in. from the right wall.

CAUTION

Take extreme care in drilling these holes as the vehicle gasoline tank is directly below this location.

b. Bolt a pair of MT-1338/MRC-20 mountings through these holes using

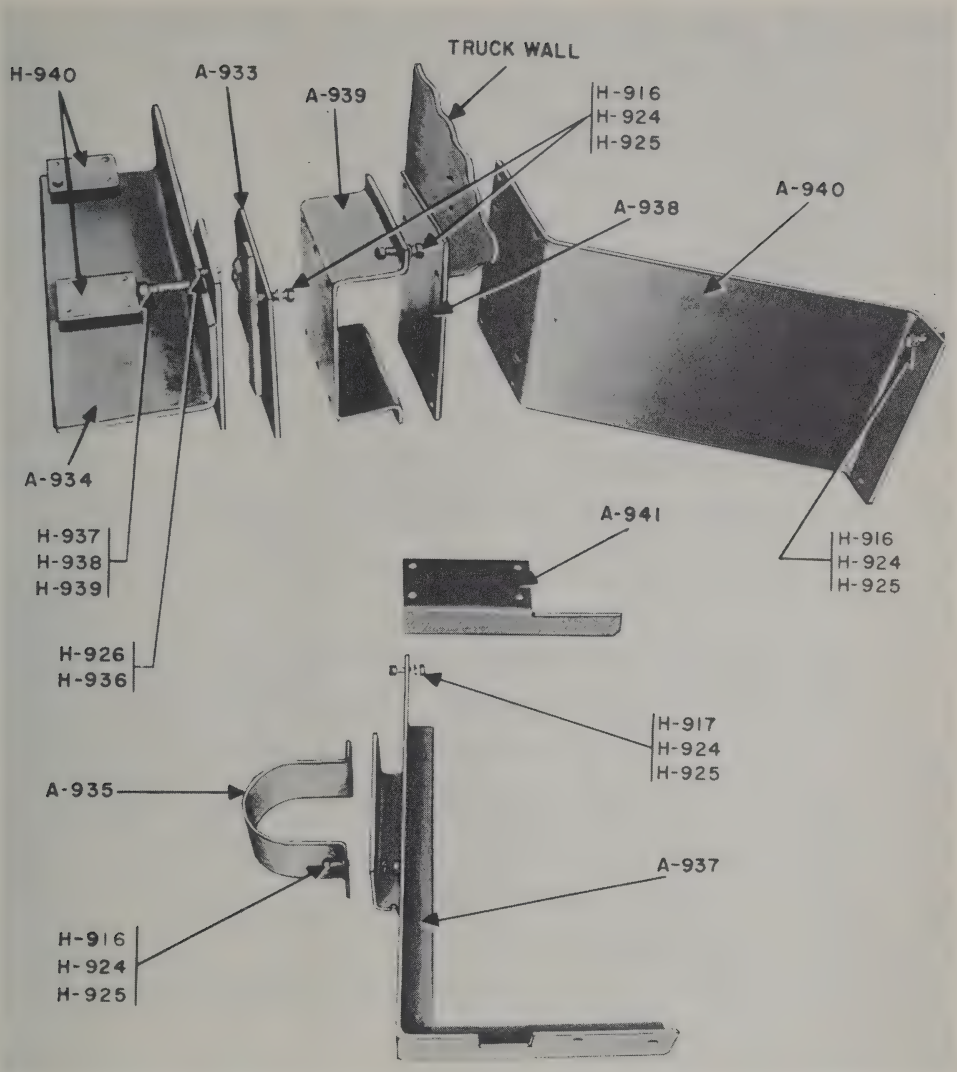


Figure 3-7. Telescopic Mast Mounting Parts for M-37 Truck

5/16-18 by 2 in. bolts H-931, lockwashers H-925, nuts H-924 and spacers H-906 at the front holes and 5/16-18 by 2-1/2 in. bolts H-945, lockwashers H-925, nuts H-924 and spacers H-906 at the rear.

c. Place power plant HRU-28A on these mountings and secure with 1/4-20 by 3/4 in. bolts H-912, plain washers H-902 and lockwashers H-921.

3-23. FIRE EXTINGUISHERS.

a. Bolt the fire extinguisher mounting clip to the upper two holes on the gusset side of the spare tire mounting MT-1348/MRC-20 using two 1/4-20 by 3/4 in. bolts H-901, lockwashers H-921 and nuts H-920.

b. Place the fire extinguisher in its mounting clip.

c. Place the spacer assembly A-910 between the fire extinguisher and the tire mounting in line with the two holes near the bottom of tire mounting.

d. Place the U-bolt H-905 around the fire extinguisher and through the spacer assembly A-910 and the two holes in the tire mounting and secure with two 1/4-20 hex nuts H-920 and lockwashers H-921.

3-24. CONTROL GROUP PANEL AND PANEL MOUNT. The control group mounting MT-1361-MRC/20 is installed in the cab of the M-37 truck just to the right of the drivers seat (see figure 3-4).

a. Remove the seat cushions.

b. Drill one 7/16 in. hole in the center of the forward wall of the seat well and 1 in. down from the top.

c. Locate the vertical center line on the back cushion support wall and drill four 7/16 in. holes located as follows:- (1) one hole 1-3/4 in.

down from the top and 5-1/4 in. to the left of the center line, (toward driver's seat); (2) one hole 4-3/4 in. down from the top and 5-1/4 in. to the left of center line; (3) one hole 1-3/4 in. down from the top and 5-7/8 in. to the right of center line, (away from driver's seat); (4) one hole 4-3/4 in. down from the top and 5-7/8 in. to the right of center line.

d. Insert a 5/16-18 by 2 in. bolt H-931 with a H-925 lockwasher on it in each of the top holes and secure with H-924 nuts.

e. Insert a 5/16-18 by 2 in. bolt H-931 with a H-925 lockwasher on it in each of the two lower holes, add a H-927 spacer on each and secure with H-924 nuts.

f. Bolt the A-926 brace to the hole in the forward wall of the seat well, using a 5/16-18 by 2 in. long bolt H-931, a H-928 spacer between the brace and the wall and a H-925 lockwasher and a H-924 nut. Leave enough play so that the brace may be later moved to engage its slotted end with the tie-in bar A-925.

g. Replace the seat cushions.

h. Install the right and left supports, A-924A and A-924B, by placing over the back cushion and securing them with the bolts installed in steps d. and e. The off-center holes in these support should be on the inside toward each other. Secure with H-925 lockwashers and H-924 nuts.

i. Remove the angle brackets underneath and place the control group panel on these supports lining up the holes in the assembly with those on the supports and securing the rear end with two 5/16-18 by 1-1/4 in. bolts H-916, H-925 lockwashers and H-924 nuts.

j. Bolt the A-925 tie-in bar assembly underneath the A-924A and A-924B supports and the control group assembly at the holes in the forward end using H-916, H-925 and H-924 bolts, lockwashers and nuts. The projecting nut on A-925 should be facing forward.

k. Fasten A-926 brace to the A-925 tie-in bar with the H-930 thumb screw and tighten. Bolt at the bottom of A-926 may be further tightened at this time.

3-25, HF ANTENNA

a. Position the A-603 MP-50 mounting assembly in the rear corner of the M-37 truck right side wall just forward of the rear vertical channel and just below thetop flare and mark the location of the four bolt holes and 1 inch center hole.

b. Drill four 7/16 in. holes for the bolts and the 1 inch center hole.

c. Bolt the short side of A-603 to the side wall using four 5/16-18 by 3/4 in. long bolts H-917, H-933 plain washers, H-925 lockwashers and H-924 nuts. The long side of A-603 should be vertical and facing toward the rear.

d. Install the 1 inch H-932 grommet in the center hole.

e. Bolt the short side of the A-601 MP-49 mounting assembly to the long side of A-603 using four 5/16-18 by 3/4 in. long bolts H-917, H-933 plain washers, H-925 lockwashers and H-924 nuts.

f. Install the HF antenna following the procedure of paragraph 3-12.

3-26 VHF ANTENNA AT-462/MRC-20.

a. Position the A-702 MP-50 mounting assembly near the front corner of the truck right side wall 8-1/2 in. back from the front corner and 11 in. above the bottom edge (see figure 3-4) so that the 1 inch center hole

coincides with the 1 inch knockout in the truck wall. Mark the location of the four bolt holes.

b. Drill four 3/8 in. holes for the bolts and remove the 1 inch knockout.

c. Follow the directions given in paragraph 3-13, c to k inclusive to complete the VHF antenna installation.

3-27. TELESCOPIC MAST AND UHF ANTENNA. (See figures 3-5 and 3-7.)

a. Bolt the bracket A-940 to the two holes in the left vertical side of the A-917 tire support base assembly using two 5/16-18 by 1-1/4 in. bolts H-916, lockwashers H-925 and H-924 nuts. The other end of this bracket should lie flush against the left side wall of the truck.

b. Drill the eight 11/32 in. holes through the truck wall located by the eight holes in A-940.

c. Place the A-938 stiffener over these holes on the outside of the truck wall and bolt through the wall and A-363 at the center group of four holes using 5/16-18 by 1-1/4 in. long bolts H-916, H-925 lockwashers and H-924 nuts.

d. Bolt the A-939 mounting plate to the A-938 stiffener and the A-940 bracket at the outer group of four holes using the same size bolts, lockwashers and nuts.

e. Install the telescopic mast to the A-939 mounting plate, following the procedure in paragraph 3-14, step k thru u.

f. Remove the two unused bolts at the left of the tailgate support member of the truck and use them to bolt the A-937 brace assembly in position at the same holes. The other end of A-937 should be flush against the left rear wheel fender.

g. Drill two 3/8 in. holes through the fender located by the two holes

TABLE V CABLE INSTALLATION (See figures 1-1 and 3-10)

CABLE	NOMEN-CLATURE	FROM END 1	UNIT	TO END 2	UNIT	FUNCTION
W-101	CX-2558/U	*P-101 (U-16/U)	C-118A/ARC-3	P-102(AN3106-24-28S)	Electrical Equipment	AN/ARC-3
	(5ft 2in)	Branch A	C-197/ARC-3	(follow color code)	Cabinet AN/ARC-3(J-103)	Control Cable
W-106	CX-2562/U	*P-110(U-6/U)	C-87/ART-13	P-111(U-6/U)	Electrical Equipment	AN/ART-13
	(5ft 2in)				Cabinet AN/ARC-8(J-101)	Control Cable
W-110	CX-2565/U	*P-117(AN3106M-22-14S)	C-628/ARC-27	P-118(AN3106-22-14S)	Electrical Equipment	AN/ARC-27
	(5ft 2in)	Branch A	J-579/MRC-20		Cabinet AN/ARC-27(J-106)	Control Cable
W-112	CX-2566/U	P-124(AN3108-28-5S)	HRU-28A	P-125(AN3106-28-5P)	Electrical Equipment Cab.	Power Cable
	(25ft 3 in)		Power Plant		28V DC Generator (J-107)	
W-113	CX-2567/U	P-127(AN3106-22-2P)	M-38 Vehicle	P-126(AN3106-28-5P)	Electrical Equipment Cab.	For Auxiliary
	(6ft in)		Power Supply		28V DC Generator (J-107)	Use Only
W-114	CX-2568/U	P-129(AN3106-18-4S)	J-302, Mast	P-131(AN3106-18 12S)	Antenna Mast Control	Telescopic Mast
	(12ft 5in)		UP-DOWN Limit		C-1328/MRC-20 (J-404)	Control & Power Cable
		P-128(AN3106-18-3P)	J-108, Elec.			
		Branch A	Equip Cabinet			
		P-130(AN3106-18-4S)	J-303, Mast Motor			
		Branch B				
		(follow color code)				

TABLE V CABLE INSTALLATION (See figures 1-1 and 3-10) con'd.

CABLE	NOMEN-CLATURE	FROM END 1	TO UNIT	END 2	UNIT	FUNCTION
W-118	CX-2569/U (5ft 2in)	*P-147(U-16/U)	J-401, Remote Switching Control	P-146(AN3106-24-28S) (follow color code)	Electrical Equipment Cab. RETRANSMISSION (J-111)	Electronic Switch Control Cable
W-120	PFGL No. 10 Single Wire	Wire end	E-107, HF, Elec. Equip. Cabinet	Wire end	Binding Post HF Antenna	Feed HF Antenna
W-121	RG-58C/U Coaxial Cable	P-701(UG-88/U)	J-109, VHF, Elec. Equip. Cab.	Permanently Connected	VHF Antenna Mast Assembly	Feed VHF Antenna
W-122	CG-409C/U (5ft 0in)	P-143(UG-88/U)	J-110, UHF, Elec. Equip. Cab.	P-144(UG-88/U) P-145(UG-306/U)	UHF Antenna Telescopic Mast (J-301)	Feed UHF Antenna

* Installed before shipment.

in A-937. Bolt A-937 to the fender using two 5/16-18 by 3/4 in. long bolts H-917, H-925 lockwashers and H-924 nuts.

h. Place the lower A-935 mounting collar around the mast and bolt at the four holes in A-937 using 5/16-18 by 1-1/4 in. bolts H-916, H-925 lockwashers and H-924 nuts.

i. Connect the cables as in Table V.

j. Connect height counter drive cable O-385 as in paragraph 3-14, step s.

3-28. TELESCOPIC MAST REST SUPPORT A-941.

a. Remove the lower A-935 mounting collar installed in paragraph 3-28, step m.

b. Place A-935 around the mast above the collars (beginning at smooth part of mast) and loosely bolt it to the A-941 rest supports using the bolts removed in step a.

c. Remove the two 3/8-16 by 3/4 in. H-936 bolts installed in paragraph 3-14, step m, and rotate the mast forward to a horizontal position.

d. Slide the A-941 support along the mast until it fits snugly against the top of the rear fender and locate the two mounting holes.

e. Drill two 3/8 in. holes in the fender at the points located in step d.

f. Bolt the A-914 support to the fender at these holes using two 5/16-18 by 3/4 in. long bolts H-917, H-925 lockwashers and H-924 nuts. The mast may now be returned to its original position.

3-29. CABLES. Cabling installation procedure is in Table V.

3-30. EQUIPMENT CHECKS.

3-31. PREOPERATING.

a. Remove front door by releasing H-102 draw catches and the O-101 and

O-102 locking cams. Door may be stored on back of the equipment case using the provided thumb screws.

b. Check and tighten all cable connectors.

c. Be sure all circuit breaker switches, next to speaker terminal, (see figure 1-1, sheet 3, B) are in the OFF position.

d. Check battery voltage. (1) Turn AN/ARC-13 Circuit Breaker S-103 to ON position. (2) Turn T-47A/ART-13 emission switch to VOICE position. (3) Turn BATTERY VOLTAGE - PA GRID - PA PLATE switch on the T-47A/ART-13 Transmitter to the BATTERY VOLTAGE position. (4) Needle should fall within the light area under BATTERY on the meter located just to the left of the EMISSION switch. (5) Return all switches to the OFF position.

e. Check the water level in the 2HRN-US batteries located in the battery box below the shelf in the left wing compartment. Water level should be 1/4 in. or more above the plates.

3-32. OPERATING. In order to determine if the equipment is functioning properly after installation it will be necessary to put each unit in operation. To do this, follow the operating procedure outlined in Section IV, Operation.

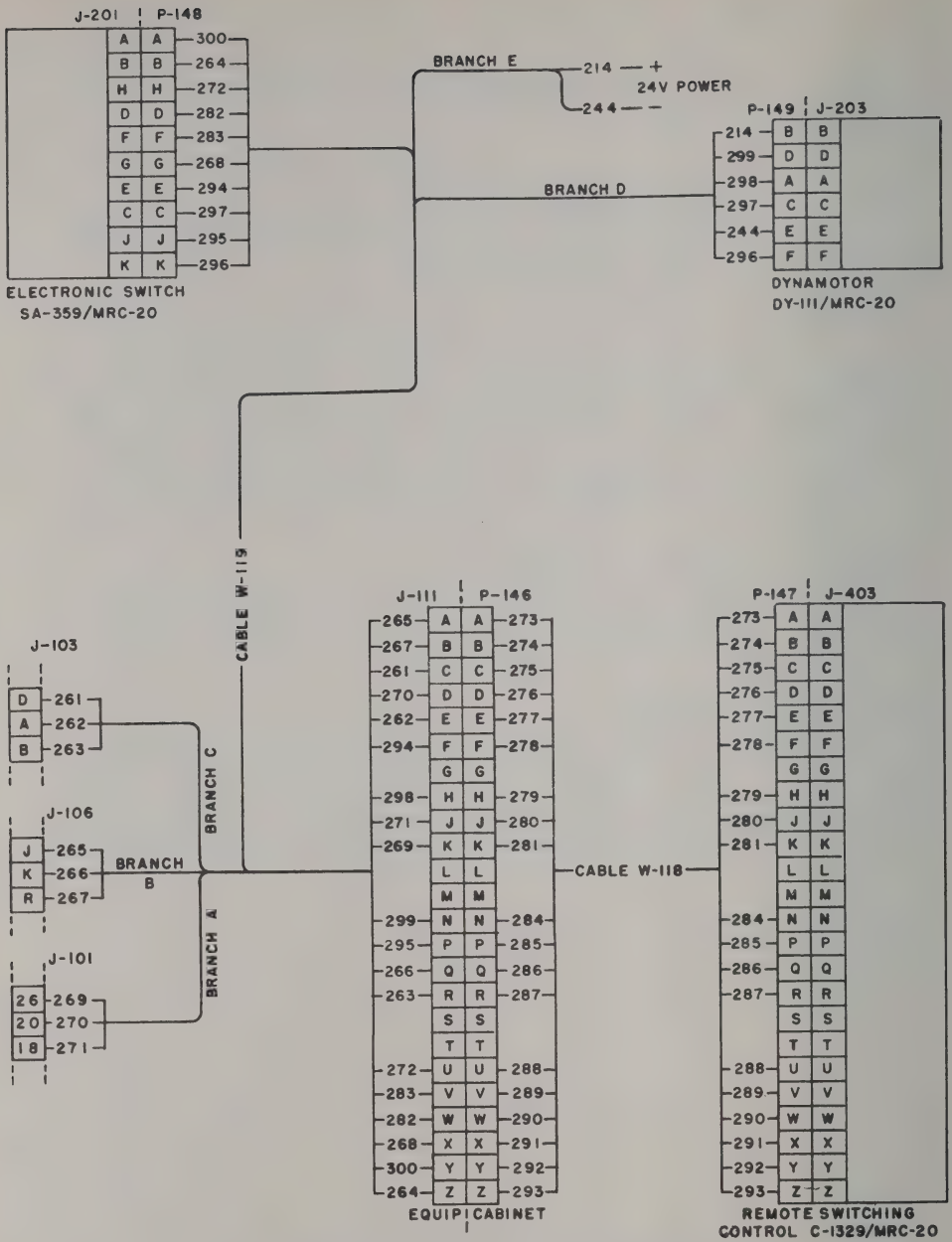


Figure 3-8 Cable Junction Points
SA-359/MRC-20

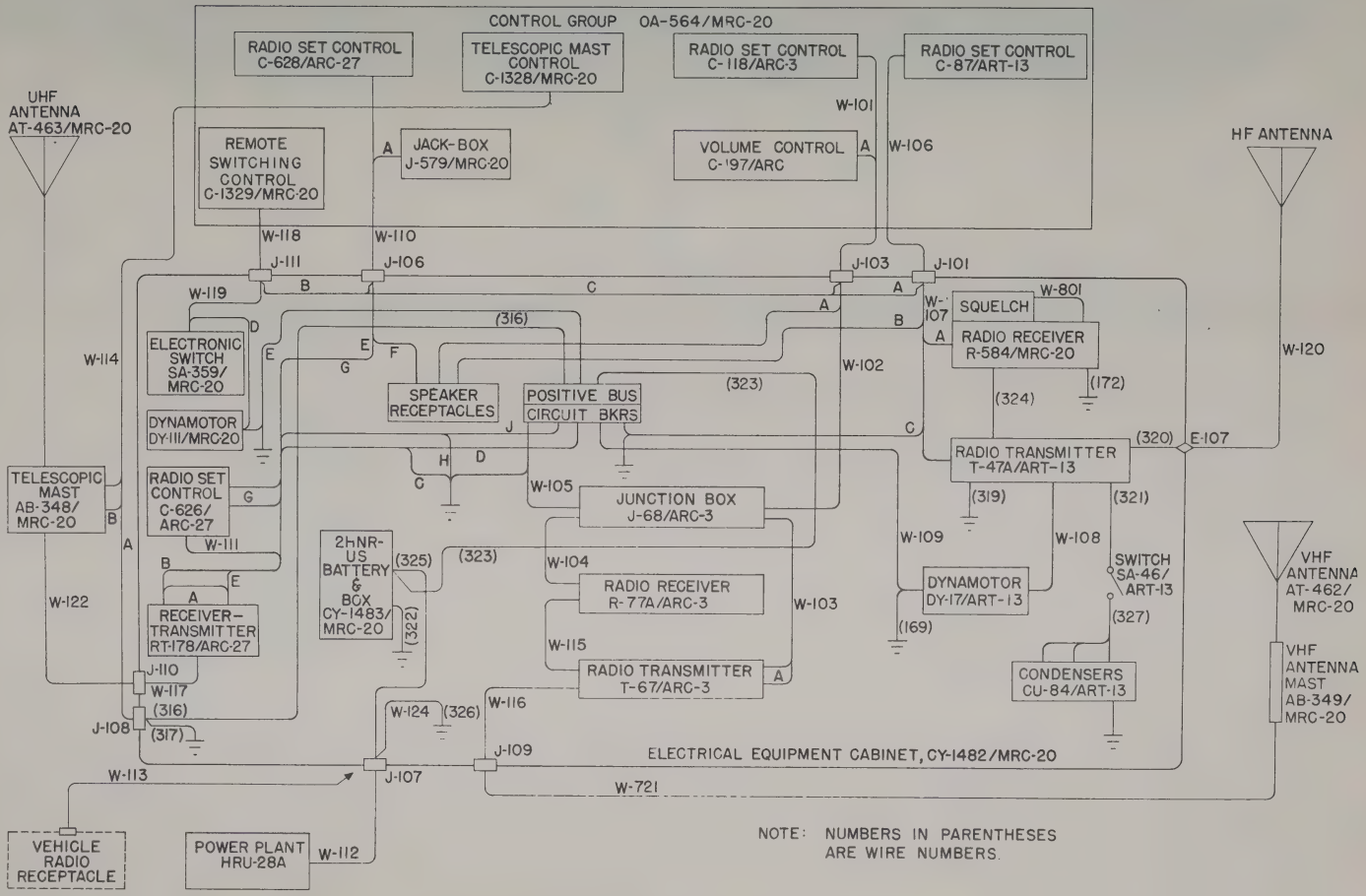
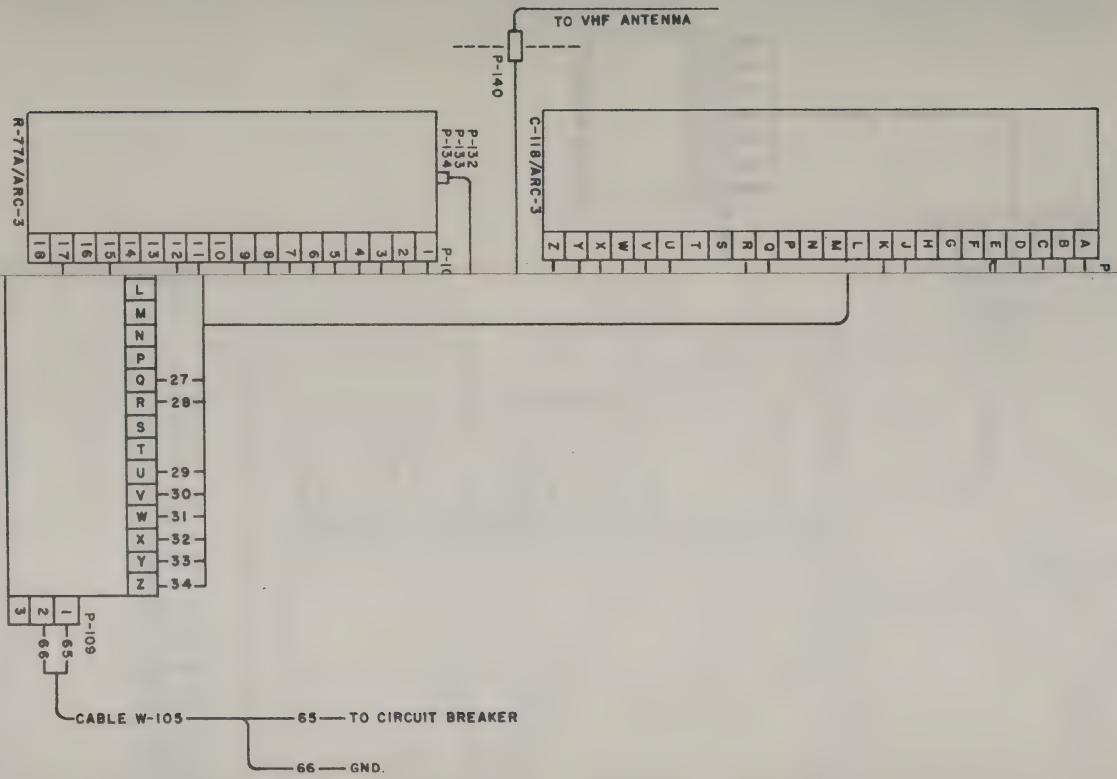


Figure 3-9, Overall Cabling Diagram.


TO VHF ANTENNA
P-140
R-77A/ARC-3
P-132
P-133
P-134
C-118/ARC-3
18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
Z Y X W V U T S R Q P N M L K J H G F E D C B A
L M N P Q R S T U V W X Y Z
27 28 29 30 31 32 33 34
3 2 1 P-109
66 65
CABLE W-105
65 — TO CIRCUIT BREAKER
66 — GND.

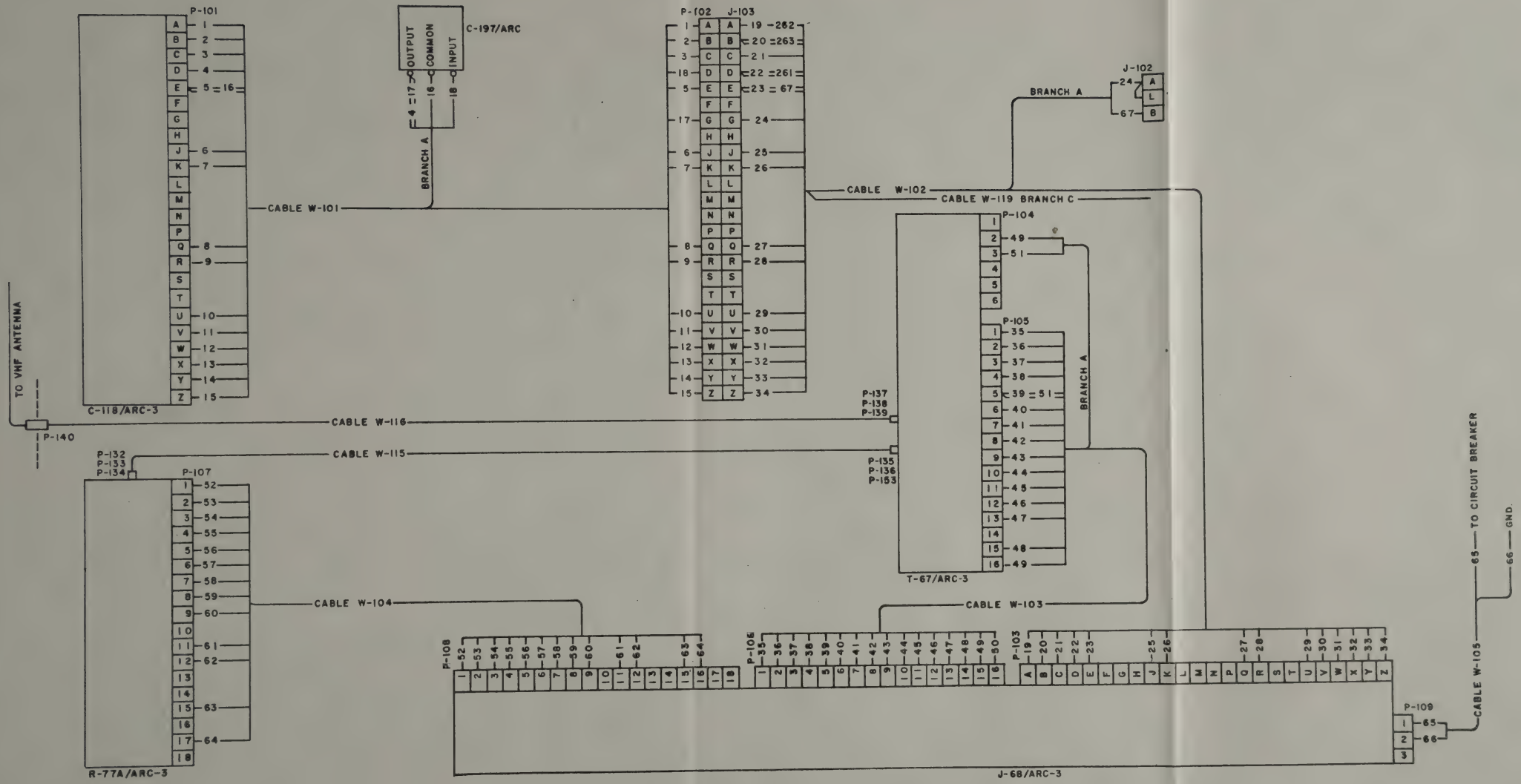


Figure 3-10. Cable Junction Points ARC-3.

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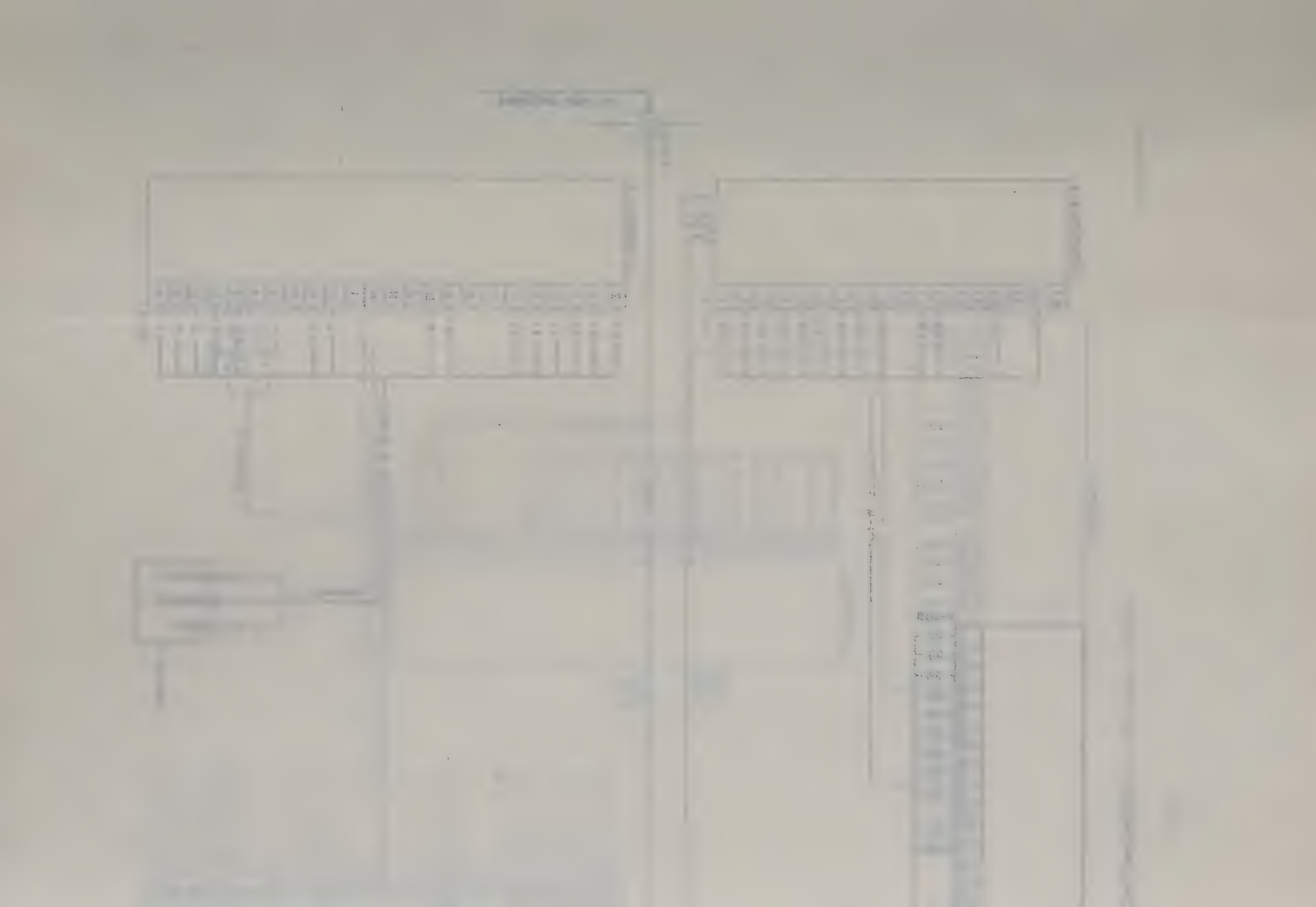

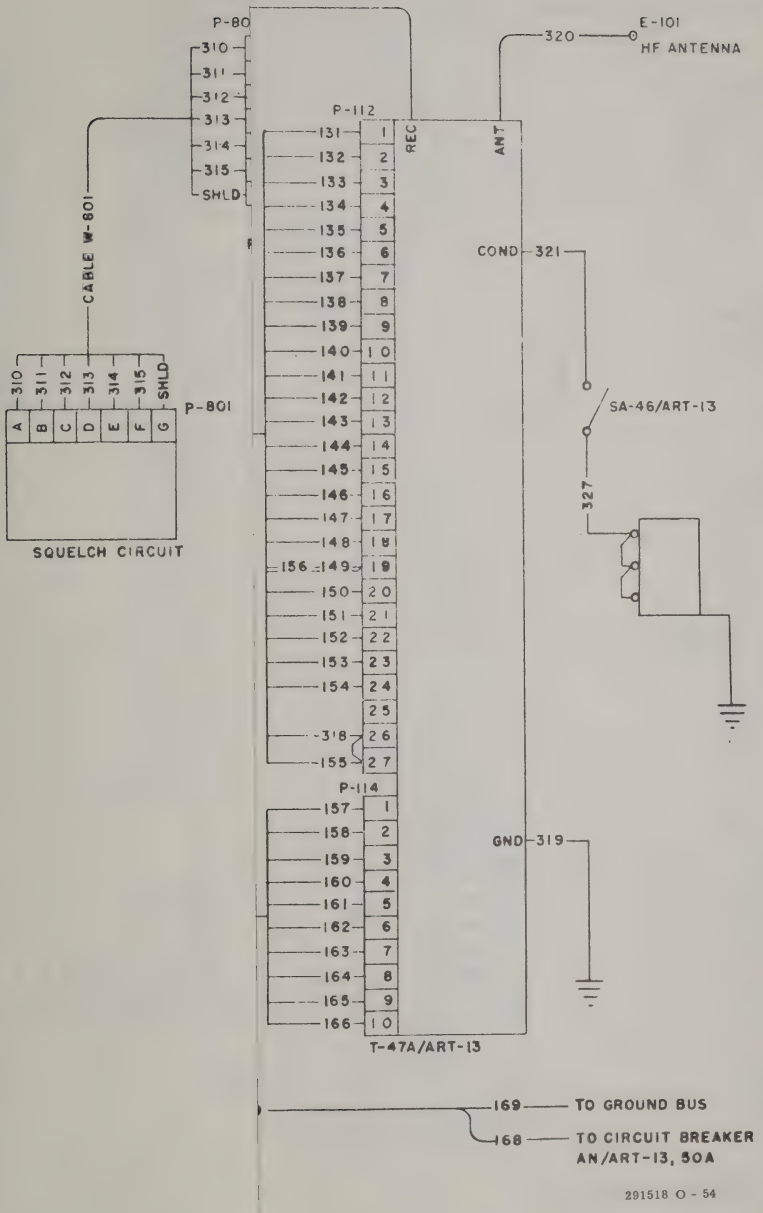
P-80
310
311
312
313
314
315
SHLD
CABLE W-801
P-801
A
B
C
D
E
F
G
SQUELCH CIRCUIT
P-112
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
156
149
150
151
152
153
154
318
155
REC
ANT
320
E-101
HF ANTENNA
COND
321
SA-46/ART-13
327
P-114
157
158
159
160
161
162
163
164
165
166
GND
319
T-47A/ART-13
169
TO GROUND BUS
168
TO CIRCUIT BREAKER
AN/ART-13, 50A

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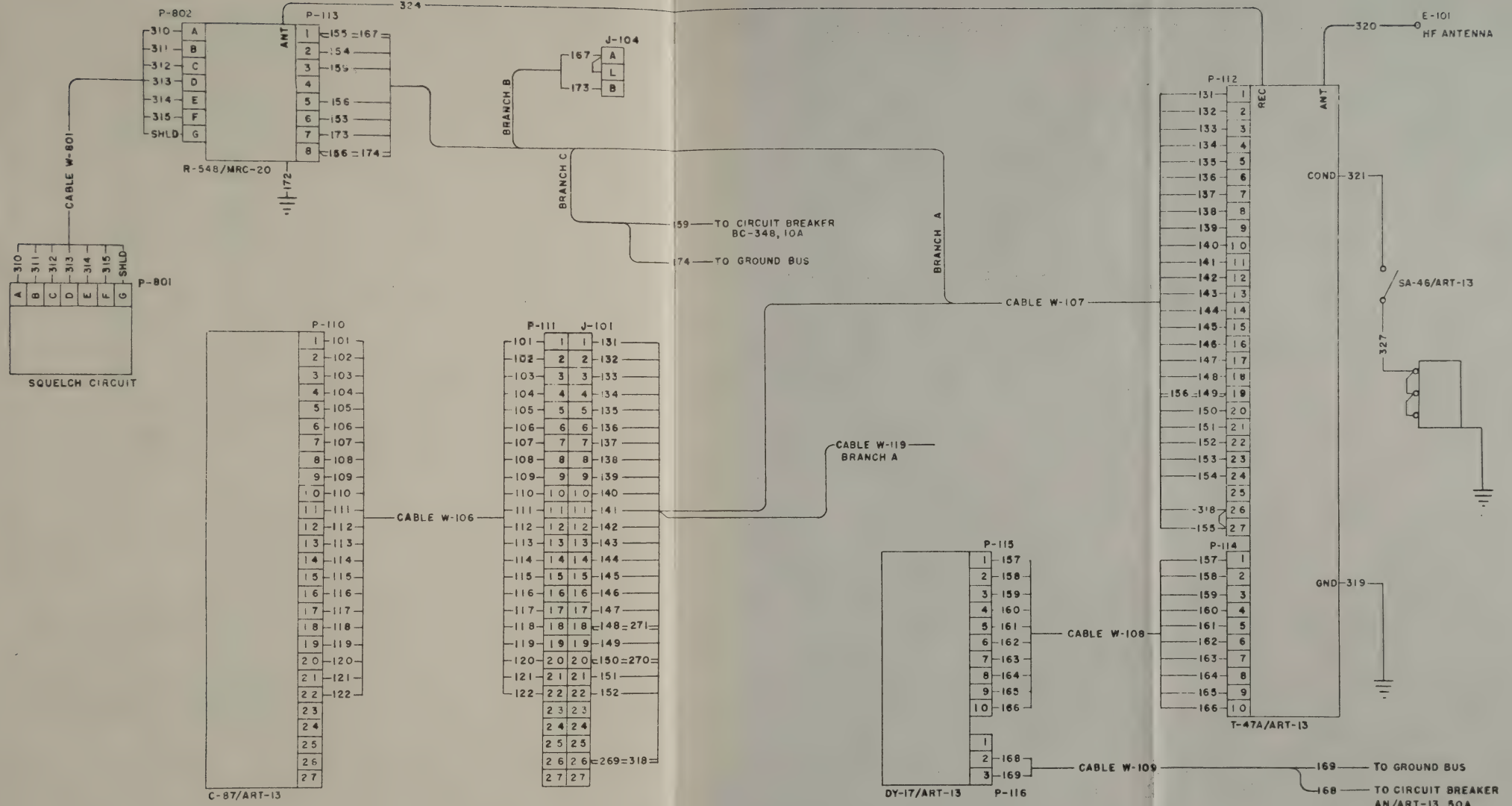

Figure 3-11. Cable Junction Points, ARC-8.

P-1 CABLE W-117

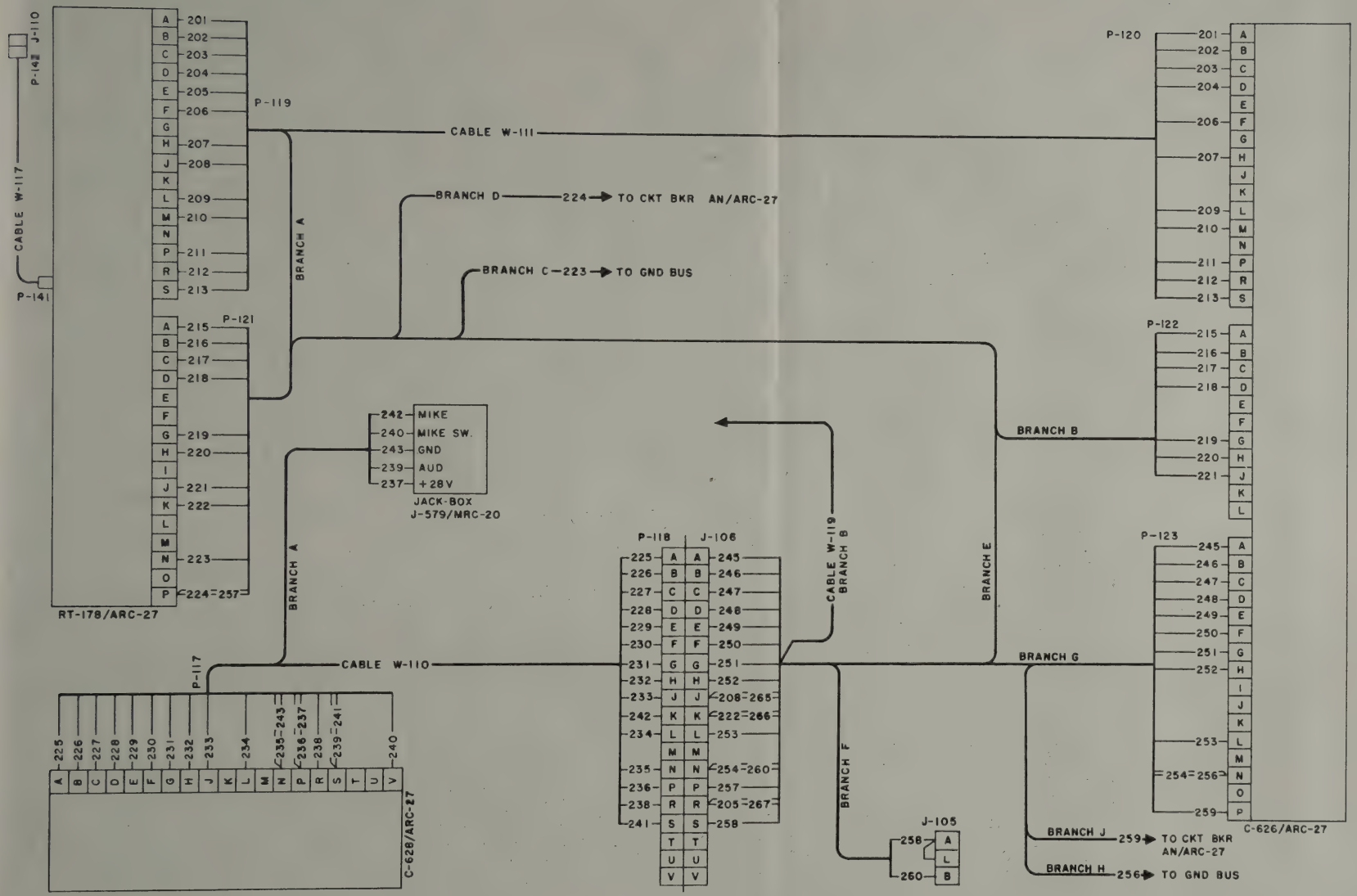

Figure 3-12. Cable Junction Points, ARC-27.

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SECTION IV

OPERATION

4-1. GENERAL.

4-2. The receivers and transmitters making up Radio Set AN/MRC-20 may be operated as follows:-

a. Locally.

b. One at a time with remote control using one set of RC-261 equipment.

c. In pairs with remote control using both sets of RC-261 equipment.

d. In pairs in a voice-controlled system using the retransmission electronic switch.

4-3. Since the operation of the individual sets is the same for any method of operation, the operating procedure for each set operating as a unit will be given first.

Note

During operation both wing covers should be held open by the H-183 cover supports to provide ventilation for the equipment.

4-4. GROUND STAKE.

a. Remove the cable connectors from C-626/ARC-27 unit in the left wing compartment (see figure 1-11).

b. Loosen the thumb screw holding the shelf in place.

c. Lift the shelf with the attached C-626/ARC-27 unit out of the compartment.

d. Loosen the hammer hold down screw and remove hammer.

e. Remove the thumb screw holding E-101 ground stake and cable and take out ground stake and cable.

f. Drive the ground stake in the dampest ground within cable reach and attach cable to the GROUND stud in the rear of the left wing compartment.

g. Replace Hammer.

h. Replace shelf and the three cable connectors to the C-626/ARC-27 unit. Tighten securely.

4-5. OPERATING POWER PLANT HRU-28A.

4-6. FUEL AND OIL.

a. Put 1/2 pint of aircraft engine oil Spec. AN-VV-0446A, Grade 1065, or if not available, lubricating oil Spec. VV-0-496, SAE 30, into a 1 gallon measure. To measure oil, fill the fuel container filler cap four times (cap capacity 1/8 pint).

b. Add 1 to 2 quarts of Aircraft Engine Fuel Spec. No. AN-F-26, Grade 91 or AN-F-28, Grade 130 and stir with a clean stick until it foams.

c. Fill measure with fuel and stir again.

d. Ground measure to power plant frame and pour mixture into fuel container using care not to spill any. This is the only lubrication required.

e. Fill oil-bath air-cleaner to oil bead with the same oil as used in fuel mixture. Do not fill above indicated level.

4-7. STARTING.

a. Turn shut-off valve on top of fuel container counterclockwise two turns.

b. In extremely cold weather, open carburetor adjusting needle 1/4 turn counterclockwise from normal setting.

c. Choke by pulling plunger button on priming pump way up and push down quickly. Repeat two or three times. In cold weather, repeat five to eight times.

d. Depress starting switch on control box. Release when motor starts.

e. After engine starts, it may be necessary to operate the priming pump, particularly in cold weather until engine is running smoothly.

f. If engine fails to start after ten seconds, it may be flooded. If so, open drain cock on crankcase and turn engine over several times with starting switch to expel raw fuel. Close drain cock and depress starting switch again if engine has not already started.

g. If batteries are dead, use rope starter as follows:- (1) Wind starting rope on starter plate in the direction of arrow, (2) Follow directions in step a. thru c. above, (3) Brace hand on unit and give rope a quick pull. Repeat until motor starts. It may be neccessary to operate priming pump until engine is running smoothly, (4) If engine floods, repeat step f. above using rope to turn engine over.

4-8. RUNNING. Engine should run and automatically provide correct voltage without further attention other than refueling. The voltage regulator is factory adjusted to hold generator voltage at 28.5 volts

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as read on volt-meter. Under heavy load a lower voltage may be read on meter.

4-9. STOPPING.

a. For final stopping, turn shut-off valve on top of fuel container clockwise as far as possible. Unit will run until fuel in carburetor is consumed.

b. For EMERGENCY or short period stopping, press red stop button on magneto stator plate and hold firmly until engine stops.

4-10. EMERGENCY OPERATION.

4-11. If the HRU-28A power plant fails, the system may be operated from the vehicle power supply.

a. Connect the provided 2 wire CX-2567/U cable (6 ft 1 in.) from the vehicle power output receptacle located under the occupants seat to the J-107 POWER receptacle on the left wing compartment.

b. Keep vehicle motor running fast enough to provide charging current while operating the AN/MRC-20 equipment as the battery supply is not adequate to operate the equipment for more than emergency short periods.

4-12. OPERATING THE AN/ARC-3 RADIO SET.

CAUTION

1. When AN/ARC-3 Radio Set has been turned off, do not turn the set on for one minute.

2. Do not release buttons or push the "OFF" button while set is cycling.

4-13. TO START THE EQUIPMENT.

a. Throw the AN/ARC-3 circuit breaker S-101 located on the Equipment Cabinet (see figure 1-1, sheet 3, B) to the ON position. This completes the primary power circuit to the AN/ARC-3 Radio Set.

b. Depress any one of the eight red channel selector buttons designated "A" through "H" on the C-118A/ARC-3 Control Unit located on the Control Panel (see figure 1-1), sheet 4,B). This automatically releases the OFF push button and applies power to the equipment which will then automatically tune to the channel selected.

4-14. TO STOP EQUIPMENT.

a. Depress the "OFF" push button on the C-118A/ARC-3 control unit.

b. Throw the AN/ARC-3 circuit breaker S-101 switch to "OFF" position.

4-15. EMERGENCY STOPPING.

a. Throw the AN/ARC-3 circuit breaker S-101 switch to "OFF" position.

4-16. TO OPERATE EQUIPMENT.

a. Plug the T-17 microphone found on the control panel or in the right wing compartment into the MIC. jack on the C-118A/ARC-3 control unit.

b. Plug HS-33 headset found in the right wing compartment into the TEL. jack on the control unit.

c. Start the equipment using procedure in paragraph 4-13 above and depressing correct button for operating channel desired. Channel frequencies are set up by the maintenance depot for the specific tactical use of the AN/MRC-20 system.

d. When tone heard in headset stops, the receiver and transmitter have been turned to the selected frequency and the received signal should be heard.

e. Adjust the squelch control. Access to the screwdriver adjustment of this control is provided by the sliding cover marked "SQUELCH" located just to the right of the frequency indicating dial on the front panel of the R-77/ARC-3 receiver (see figure 1-1, sheet 3, B). (1) Counterclockwise rotation increases squelch action. (2) Clockwise rotation decreases squelch action.

Note

This is an important adjustment for the proper operation of the AN/MRC-20 system. Set the squelch action no higher than necessary to reduce the background noise level to a tolerable level, as too much squelch action may prevent reception of weak signals and too little squelch may result in improper operation of the electronic switch, see paragraph 4-35 following.

f. Adjust the C-197/ARC-3 volume control located on the control panel for desired audio volume (see figure 1-1, sheet 4, B).

g. Press the "Press-to-talk" button on the T-17 microphone to voice operate the transmitter. If the speech (side tone) which modulates the transmitter is heard in the headset, the transmitter is operating.

h. If loudspeaker operation is desired, remove one LS-166/U loudspeaker from the top shelf of the left wing compartment and connect it to the AN/ARC-3 loudspeaker receptacle on the front upper corner of the equipment cabinet near the ON-OFF circuit breakers (see figure 1-1, sheet 3, B).

4-17. TO CHANGE OPERATING CHANNEL.

a. Depress the button for the desired channel. Wait for tone in the headset to stop showing auto-tuning action to be completed.

b. Listen for signal. Readjust squelch control if necessary and volume control for desired audio volume.

c. Push "Press-to-talk" button on T-17 microphone to operate the transmitter.

4-18. FOR MCW OPERATION.

a. Key the transmitter carrier by using the "TONE" button on the C-1188A/ARC-3 control unit. Maximum keying speed is limited to approximately 15 words per minute.

4-19. OPERATING RADIO SET AN/ARC-8.

4-20. TO START EQUIPMENT. The AN/ARC-8 Radio Set includes the R-584/MRC-20 Receiver and the AN/ART-13A Transmitting Set.

a. Throw the 10A, R-584/MRC-20 circuit breaker switch S-102 and the 50A, AN/ART-13 circuit breaker switch S-103 ON (see figure 1-1, sheet 3, B). This completes the primary power circuit to the AN/ARC-8 radio set.

b. Turn the AVC-OFF-MVC switch on the R-584/MRC-20 (see figure 1-2) to the MVC position. This turns the R-584/MRC-20 receiver on. Allow 30 seconds for tube warm-up.

c. Turn the TRANSMITTER switch on the C-87/ART-13 control unit (see figure 1-1, sheet 4, B) located on the control panel to VOICE position. Pilot lamp should light. Check the position of the LOCAL-REMOTE switch on the T-47A/ART-13 transmitter (see figure 1-1, sheet 3, B) if pilot lamp does not light after 30 seconds. For control by the C-87/ART-13 unit this switch should be in the REMOTE position.

4-21. TO STOP EQUIPMENT.

a. Turn AVC-OFF-MVC switch on the R-584/MRC-20 receiver to OFF position and throw R-584/MRC-20 circuit breaker off.

b. Turn the OFF-VOICE-CW-MCW switch to the OFF position and throw AN/ART-13 circuit breaker OFF.

4-22. EMERGENCY STOPPING.

a. Throw both the R-584/MRC-20 and the AN/ART-13 circuit breakers off. This breaks primary power circuits.

4-23. TO OPERATE RECEIVER R-584/MRC-20. (See figure 1-2.)

a. Turn the R-584/MRC-20 receiver on, see paragraph 4-20 above.

b. Plug a HS-33 headset into one of the TEL. jacks or connect a LS-166/U speaker to the R-584/MRC-20 loudspeaker receptacle located to the left of the circuit breakers, as desired.

c. Set the Band switch to the band desired.

d. Adjust the INCREASE VOL. control until slight background noise is heard.

e. Tune in the desired signal.

Note

Tuning should be done in the MVC position with the volume control advanced only as far as required for operating level. Too high a volume on strong carriers may block the receiver.

f. Be sure R-809 SQUELCH control is in the minimum position (extreme counterclockwise).

g. When signal is properly tuned, turn AVC-OFF-MVC switch to AVC position.

h. Adjust R-809 SQUELCH control until receiver is quiet with no signal but not so far that the signal is lost because of too much squelch action.

Note

Too high a SQUELCH control setting may eliminate the weaker signals.

i. Adjust the INCREASE VOL. control for desired audio level.

4-24. TO OPERATE TRANSMITTER T-47A/ART-13.

a. Turn the T-47A/ART-13 transmitter on, see paragraph 4-20 above.

b. Select the desired operating channel with the CHANNEL selector switch on the C-87/ART-13 control unit.

c. Plug in a T-17 microphone into the microphone jack, also on the C-87/ART-13 control unit.

d. Press the "Press-to-talk" button on the microphone to modulate the transmitter. If CW of MCW operation is desired, put the switch on the control unit to CW or MCW and key with the provided key in the control unit.

CAUTION

Under no circumstances should the transmitter be actually operating (key down or microphone switch closed) when the TRANSMITTER switch is being operated, (or EMISSION switch on the T-47A/ART-13 panel). Such operation can cause an arc to occur and damage the relay contacts. Be sure all auto-tune controls are against the stops in a clockwise direction. The mechanism always leaves them in the proper position and they should not be tampered with after cycling. Proper positioning may be

checked by applying a firm but not heavy force to each control in a clockwise direction until the control strikes the stop.

4-25. TO CHANGE OPERATING CHANNEL.

a. Depress desired channel button on the CHANNEL selector C-87/ART-13 switch control unit. Auto-tune mechanism will automatically set up selected channel.

b. Retune the R-584/MRC-20 receiver to the new frequency selected following procedure in paragraph 4-23.

4-26. OPERATING RADIO SET AN/ARC-27.

4-27. TO START EQUIPMENT.

a. Throw the 25A, AN/ARC-27 circuit breaker switch S-104 and the 10A, AN/ARC-27 circuit breaker switch S-105 on. This completes the primary power circuit to the AN/ARC-27 radio set indicated by pilot lamp on the jack box on the control group panel.

b. Turn the "OFF T/R - T/R-G-REC-ADF" switch on the C-628/ARC-27 control unit located on the control panel (see figure 1-1, sheet 4, B) to the T/R position. Receiver should be operative and the transmitter on standby. Pilot lamps on the C-628/ARC-27 should light.

4-28. TO STOP EQUIPMENT.

a. Turn the "OFF T/R - T/R-G-REC-ADF" switch to OFF position.

b. Throw the 25A, AN/ARC-27 and the 10A, AN/ARC-27 circuit breaker switches off.

4-29. EMERGENCY STOPPING.

a. Throw the 25A, AN/ARC-27 and the 10A, AN/ARC-27 circuit breaker switches off.

4-30. TO OPERATE RADIO SET AN/ARC-27.

a. Check the C-626/ARC-27 control unit in the wing compartment (see figure 1-11) to see that the ON-OFF switch is ON, the TONE-VOICE switch is on VOICE and the LOCAL-REMOTE switch is on REMOTE position.

b. Set CHANNEL switch on the C-628/ARC-27 control unit to the desired operating channel. G position is the guard receiver position.

c. Start the AN/ARC-27 radio set (see paragraph 4-27 above).

d. Plug the T-17 microphone into the J-579/MRC-20 Jack Box Microphone jack.

e. Plug the HS-33 headset into the Jack Box phone jack, or if loudspeaker operation is desired, connect the LS-166/U loudspeaker to AN/ARC-27 speaker receptacle J-105 located to the left of the circuit breakers.

f. Adjust the VOLUME control on the C-628/ARC-27 control unit for the desired audio volume.

g. Adjust the squelch controls for both the GUARD receiver and the MAIN receiver for minimum of noise interference but not so far as to eliminate desired weak signals. These are screwdriver adjustments located on the panel of the RT-178/ARC-27 Receiver-Transmitter (see figure 1-1, sheet 4, A).

h. To transmit, push the "Press-to-talk" button on the T-17 microphone.

4-31. TO CHANGE OPERATING CHANNEL.

a. Set the channel switch on the C-628/ARC-27 control unit to the new desired operating channel, auto-tune mechanism will automatically set up the new channel selected.

4-32. OPERATING TELESCOPIC MAST AB-348/MRC-20.

4-33. POWER OPERATION.

a. TO RAISE MAST. Hold DOWN-OFF-UP switch, S-402, of the Mast Control C-1328/MRC-20 located on the control panel (see figure 1-1, sheet 4, B) in the UP position until the desired height is reached as indicated in feet and inches on the COUNTER. Switch will return to OFF position when released.

b. TO LOWER MAST. Hold DOWN-OFF switch S-402 in the DOWN position until the mast has retracted the desired amount as indicated on the counter. Switch will return to the OFF position when released.

4-34. MANUAL OPERATION.

a. TO RAISE MAST. Insert the mast drive crank, stored in the left wing compartment, in the drive assembly (this disengages the motor drive clutch) and rotate the crank until the desired height is reached.

b. TO LOWER MAST. Reverse the rotation of the crank until the desired retraction occurs.

CAUTION

There is no upper stop provided in hand cranking. Proceed slowly when yellow band appears and stop at red band. Coaxial cable may break if mast is over-extended.

CAUTION

Do not allow water to accumulate in Mast foot. Drain often at plug H-366 during rain.

4-35. OPERATING ELECTRONIC SWITCH SA-359/MRC-20.

Note

Read SECTION 1, paragraphs 1-13 to 1-16, to become familiar with the functions of this unit.

4-36. TO ENERGIZE ELECTRONIC SWITCH.

a. Turn the C-1329/MRC-20 Remote Switching Control switch S-401 (see figure 1-1, sheet 4, B) to warmup position, Pilot light on this unit will light showing the primary power circuit of the Electronic Switch to be energized. Allow a warm-up time of approximately one minute.

Note

In the following operating instructions the chosea receiver-transmitter combinations should be operative. Read paragraphs 4-1 to 4-32.

4-37. TO CONTROL RADIO SETS AN/ARC-8 AND AN/ARC-27.

a. Advance the Remote Switching Control switch S-401 to position HF-UHF. This connects the AN/ARC-27 and AN/ARC-8 receivers and transmitters to the retransmission Electronic Switch.

b. Select the desired operating channel with the CHANNEL selector switch on the C-628/ARC-27 unit (see figure 1-1, sheet 4, B).

c. Select the desired transmitting channel with C-87/ART-13 control.

d. Adjust the VOLUME control on the C-628/ARC-27 control unit to give desired audio volume. Varying this control does not affect the audio imput level to the T-47A/ART-13 transmitter.

e. Tune in the desired signal on the R-584/MRC-20 receiver following procedure in paragraph 4-23 above.

f. Throw the NOISE LIMITER switch S-301 on the Squelch Unit of the R-584/MRC-20 receiver ON.

Note

The noise limiting circuit should be operative when the receiver is used in conjunction with the retransmission Electronic Switch to prevent receiver noise peaks from improperly operating this unit.

g. Adjust the INCREASE VOL. control on the R-584/MRC-20 receiver to give sufficient audio volume to properly modulate the RT-178/ARC-27 Transmitter.

h. The Electronic Switch will then take control and automatically switch signals in either direction depending on which audio signal

reaches the unit first. Monitoring of either frequency may be done at the proper headphone jacks or loudspeaker terminals.

Note

In tuning for weak signals be sure that the SQUELCH CONTROL is in the extreme counterclockwise position (minimum squelch) as the squelch action may eliminate low level signals.

4-38. TO CONTROL RADIO SETS AN/ARC-8 AND AN/ARC-3.

a. Advance the Remote Switching Control switch S-401 to position HF-VHF. This connects the AN/ARC-3 and the AN/ARC-8 receivers and transmitters to the retransmission switch.

b. Select the desired operating channel on the C-118/ARC-3 control (see paragraph 4-17).

c. Select the desired Transmitting channel with the C-87/ART-13 control.

d. Adjust the C-197/ARC-3 volume control to give deisred audio volume. Varying this control does not affect the audio input to the T-47A/ART-13 transmitter.

e. Follow steps from e. to the end of the paragraph in paragraph 4-37 immediately preceding, for the operation of the R-584/MRC-20 receiver.

4-39. TO CONTROL RADIO SETS AN/ARC-3 AND AN/ARC-27.

a. Advance the Remote Switching Control switch S-401 to position UHF-VHF. This connects the AN/ARC-27 receivers and transmitters to the retransmission switch.

b. Select the desired signal channel on the C-118/ARC-3 control.

c. Select the desired signal channel on the C-628/ARC-27 control.

d. Adjust the C-197/ARC-3 volume control to give desired audio volume.

e. Adjust the C-628/ARC-27 VOL. control to give desired audio volume.

f. The Retransmission Electronic Switch will then take control. Monitoring of the relayed signals may be done at the proper headphone or loudspeaker terminals.

Note

"Do not leave the Electronic Switch unattended when retransmission facilities are being used. Failure of this switch may cause undesired transmitter operation."

4-40. REMOTE CONTROL OPERATION.

4-41. GENERAL. Two complete RC-261 Remote Control Units are supplied stored in the right wing compartment of the Equipment Cabinet (see figures 1-8 and 1-10). These provide remote operating facilities for either one or two radio sets.

4-42. SETTING UP FOR REMOTE OPERATION.

a. Remove the two RM-52 units from the top shelf of the right wing compartment. These are held in place by a thumb screw and bar H-134.

b. Remove the carrying harnesses, headsets, extension cords, cable reels and cable reel cranks from the right wing compartment basket.

c. Loosen the shelf-hold-down thumb screw and remove the shelf.

d. Remove the two DR-8A cable spools. The outer ends of the cables should be connected to the RM-53 units located next to the cable spools.

e. Check to be sure that the switches on the RM-53 units are in the

REMOTE position. Since operation of both units is the same, detail procedure for one setup only will be given (see Block Diagram, figure 4-1).

f. Fasten the carrying harness to the cable reel.

g. Place cable reel over the cable spool and insert crank to hold in the reel and to provide the rotating axis.

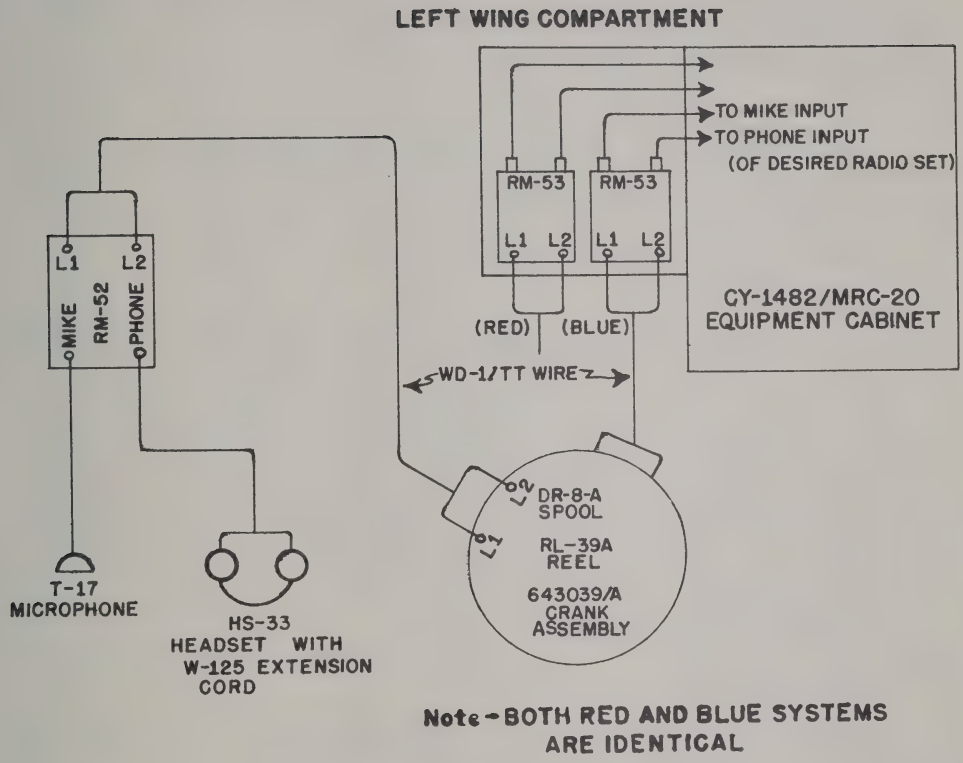
h. Connect the plugs from the RM-53 unit to the receiver-transmitter combination desired. Two sets of these plugs enter the equipment cabinet, one each PL-68 for transmitter input and one each PL-55 for receiver output. One set is connected to one RM-53 unit and the other set is connected to the other RM-53 unit. Identification between them is provided by color spots. Access to the available radio sets is as follows: (1) AN/ARC-3. At the MIC. and TEL. jacks on the C-118/ARC-3 control unit on the control panel. (2) AN/ARC-8. At the MICROPHONE jack on the T-47A/ART-13 transmitter and the TEL. jack on the R-584/MRC-20 receiver. (3) AN/ARC-27. Either at the MIC. and TEL. jacks on the Jack Box on the Control Panel or at the MIC. and PHONE jacks on the RT-178/ARC-27 radio set, whichever is most convenient.

i. Turn on the radio set chosen for remote control use, see paragraph 4-12 to 4-31 above.

j. Connect the inner end of the cable to binding posts L1 and L2 on the RM-52 unit. The inner end terminations are fastened to the edge of the cable spool by screws. Remove these screws.

k. Plug a T-17 microphone into the MIC. jack and a HS-33 headwet using the provided extension cord, W-125, into the PHONE jack of the RM-52 unit. The signal from the receiver should be heard in the headset and the "Press-to-talk" button on the microphone should actuate the transmitter. If this is not so, try reversing leads connected in step j.

Figure 4-1. Block Diagram, Remote Control Set-Up



4-1 Block Diagram, Remote Control Set-Up.

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l. Proceed to the chosen remote location reeling out the cable and bringing the RM-52 unit with the microphone and headset.

m. Operate in the usual manner, pushing "Press-to-talk" button on the microphone when transmitting and release button when receiving.

n. The second RC-261 equipment may be used in a similar manner to set up a remote control point to control a second radio set.

Note

The battery life of the dry batteries in the RM-42 units will be materially lengthened by not plugging in the microphone except during actual use.

4-43. COLD WEATHER OPERATION.

4-44. Operation of the AN/MRC-20 equipment in temperatures below -17.7°C(0°F) is limited by the telescopic mast which should not be raised or lowered at temperatures below -40°C (-40°F). At and below this temperature the coaxial cable becomes too stiff to properly wind on its drum. The rest of the equipment should operate at any temperature at which the Power Plant and storage batteries can be made to function.

4-45. CHANGING OPERATING LOCATION.

4-46. PREPARATORY STEPS.

a. Return all equipment removed from wing compartments to its proper location.

b. Tighten all wing nuts and hold-down screws in and on wing compartments.

c. Replace front cover of the equipment case and fasten securely.

d. Retract the Telescopic Mast.

e. Place plastic cover GY-1487/MRC-20 over the control group and secure with draw string.

f. Place canvas cover A-912 over the power plant and secure with hold-down straps.

SECTION V

INSPECTION AND PREVENTIVE MAINTENANCE

5-1. GENERAL.

5-2. The following tables and paragraphs give the procedure for inspection and preventive maintenance of the AN/MRC-20 Radio Set as a whole; the SA-359/MRC-20 Unit with its dynamotor DY-111/MRC-20 and Control C-1329/MRC-20; the noise limiter squelch circuit of the R-583/MRC-20 receiver; and the telescopic mast AB-348/MRC-20 with its Control C-1328/MRC-20. For further maintenance procedure for the R-584/MRC-20 receiver refer to the existing Technical Orders for the BC-348-Q and the BC-348-R receivers. Further maintenance procedure for the AN/ARC-3, AN/ARC-27 and AN/ART-13 radio equipment and the HRU-28A power plant may be found in the applicable maintenance Technical Orders for these equipments.

5-3. PERIODIC INSPECTION AND LUBRICATION.

TABLE VI PERIODIC INSPECTION (WEEKLY)

UNIT	INSPECTION	MAINTENANCE
Antennas	Dirt on Insulators	Wipe insulators clean.
RF Cables and interconnecting cables	Inspect for breaks or abrasions and loose connectors.	Tighten Connectors Badly worn cables should be replaced.
Batteries	a. Water level b. Voltage-See SECTION II, Paragraph 3. Specific Gravity at full charge should be 1.270-1.280 at 80° at indicated level on accurate hydrometer. c. Corrosion on Terminals	a. Fill to 1/4 in. above plates with distilled water. b. Keep batteries charged. c. Clean and tighten connections.

TABLE VI PERIODIC INSPECTION (WEEKLY)

UNIT	INSPECTION	MAINTENANCE
Retransmission Electronic Switch	Check Cable Connectors.	Tighten.
Telescopic Mast	a. Check Cable Connectors.	a. Tighten.
	b. Check Telescopic Sections for accumulated dirt.	b. Wipe with dry cloth.
	c. Check transmission Case for accumulated moisture.	c. Remove drain plug H-366 and drain.

TABLE VII LUBRICATION CHART

UNIT	METHOD AND TYPE OF LUBRICATION	TIME INTERVAL
Dynamotors in G.F.E.	See applicable Technical Order.	
Dynamotor, DY-11/MRC-20	Remove safety wire and screws holding end caps in place, lubrication directions are given in paragraph 5-12 below.	1000 hrs.
Motor, B-301, Telescopic Mast	Oil Fed. Spec VVO-581, Grade 20 applied with oil can at removable screw oil plug.	50 hrs. of operation.
Telescopic Mast	See Assembly Procedure Paragraph 5-17.	At assembly.
HRU-28 Motor Generator Set	See applicable Technical Order and operating Instructions, Paragraph 4-5.	

5-4. TROUBLE SHOOTING.

TABLE VIII SQUELCH AND NOISE LIMITER CIRCUIT

TROUBLE	PROBABLE CAUSE	REMEDY
No output from receiver (see applicable maintenance handbook)(both BC-348Q and BC-348R models used).	a. Failure of V-801 or V-802	a. Replace V-801 & V-802. (See pgh 5-7 below)
	b. Loose cable W-801	b. Check and tighten cable connections.
	c. Squelch control too far advanced.	c. Adjust squelch control.
No squelch action	a. Squelch control improperly adjusted.	a. Adjust squelch control.
	b. Failure of V-802	b. Replace V-802.
No noise limiting action	a. Failure of S-801	a. Replace S-801.

TABLE IX JACK BOX J-579/MRC-20

TROUBLE	PROBABLE CAUSE	REMEDY
Pilot lamp does not light with S-104 ON.	a. Failure of lamp I-401.	a. Replace I-401.
	b. Low battery power.	b. Check batteries.

TABLE X REMOTE CONTROL UNIT RC-261

TROUBLE	PROBABLE CAUSE	REMEDY
No signal received or no transmitter control at remote position.	a. Loose connections or break in WD-11 connecting cables.	a. Check cable and its connections. Try reversing leads at RM-52 unit.
	b. Output patch cords from RM-53 units in wrong positions.	b. Check output patch cords. Be sure radio sets are operating.

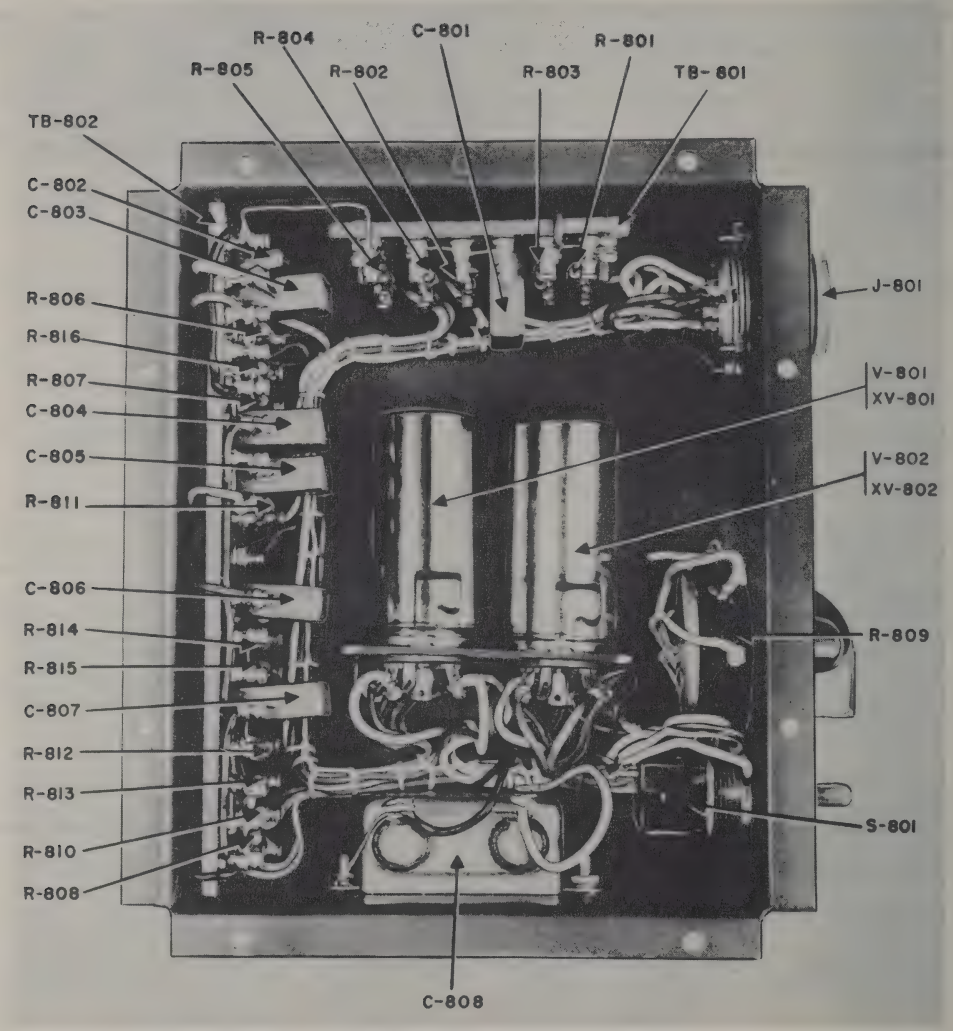


Figure 5-1. Squelch and Noise limiter Unit for Receiver R-584/URC-20

TABLE X REMOTE CONTROL UNIT RC-261 con'd.

TROUBLE	PROBABLE CAUSE	REMEDY
Signal received but no transmitter control at remote position.	Weak or dead dry batteries in the RM-52 units.	Replace batteries in RM-52 units.

TABLE XI ELECTRONIC SWITCH SA-359/MRC-20; DYNAMOTOR DY-111/MRC-20; AND CONTROL C-1329/MRC-20

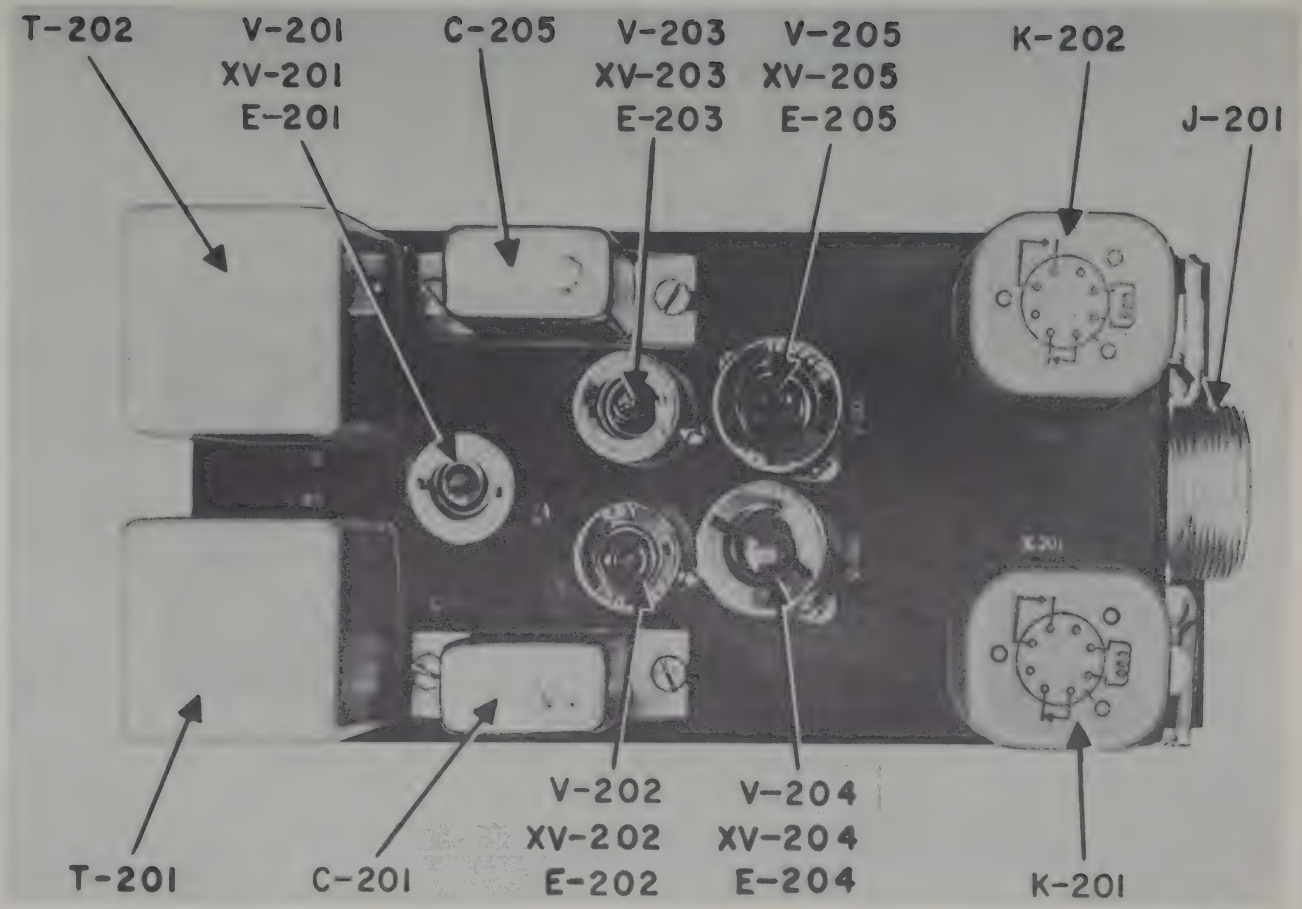
TROUBLE	PROBABLE CAUSE	REMEDY
Pilot lamp on C-1329/MRC-20 Control Unit does not light.	a. Fuse F-201 blown.	a. Replace F-201 (see Paragraph 5-6 below).
	b. Pilot lamp I-402 burned out.	b. Replace I-402.
	c. Cable W-118 not connected.	c. Connect and tighten cable W-118.
	d. Dimmer cuts off light.	d. Rotate dimmer cap.
Signal input but transmitter output unmodulated.	a. Failure of V-204 or V-205.	a. Replace V-204, V-205 (see Paragraph 5-8 below).
Transmitter on with no signal input.	a. Failure of V-202 or V-203.	a. Replace V-202 or V-203.
	b. Failure of K-201 or K-202.	b. Replace K-201 or K-202.
	c. Failure of C-202 or C-206	c. Replace C-202 or C-206.
No transmission with input to either channel.	a. Failure of V-201.	a. Replace V-201.
Both transmitters on with no modulation.	a. No high voltage, faulty dynamotor brushes.	a. Replace dynamotor brushes (see Paragraph 5-10 below).

TABLE XI ELECTRONIC SWITCH SA-359/MRC-20; DYNAMOTOR DY-111/MRC-20; AND CONTROL C-1329/MRC-20 (con't.)

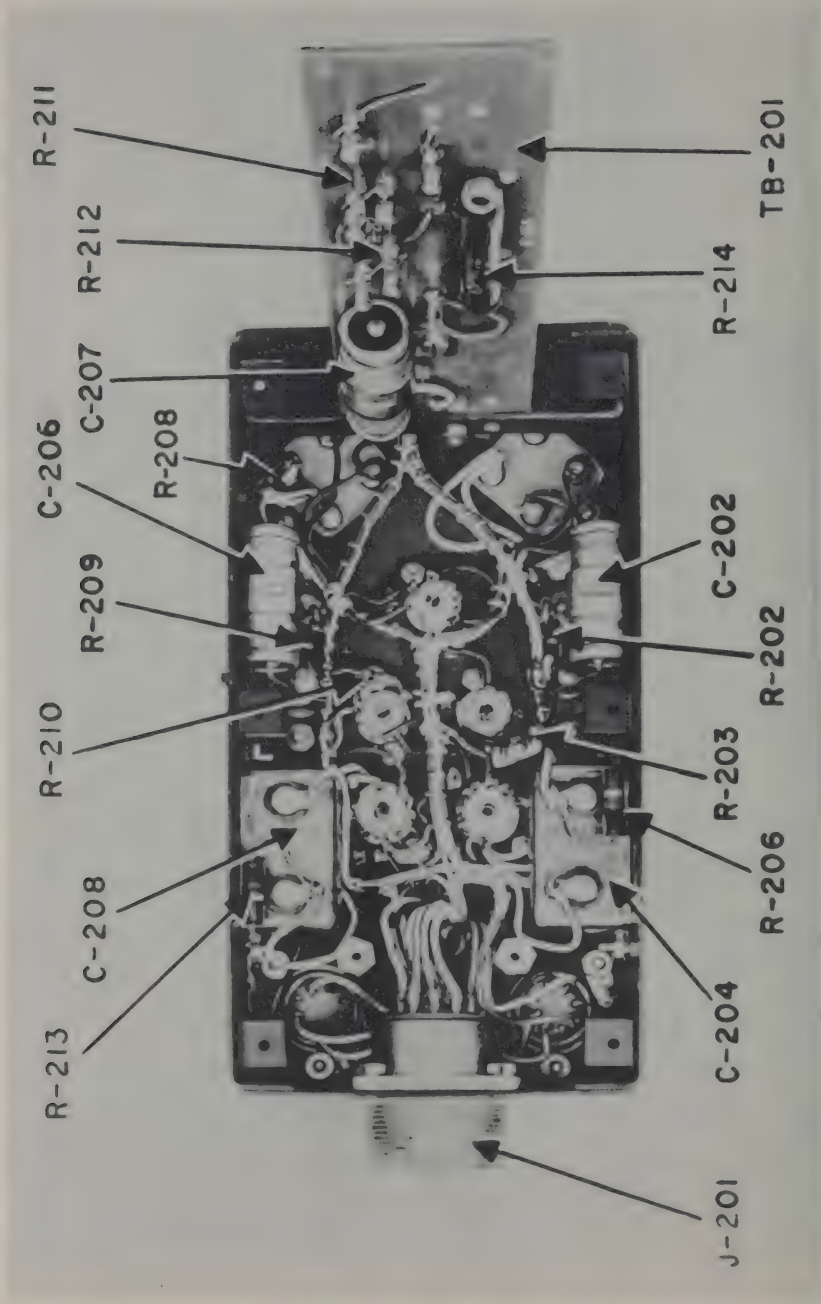
TROUBLE	PROBABLE CAUSE	REMEDY
	b. Heater failure of V-201, V-202 and/or V-203.	b. Replace V-201, V-202 and/or V-203.
Erratic operation of transmitters with signal input.	a. Failure of C-201.	a. Replace C-201.
	b. Failure of C-205.	b. Replace C-205.
Transmitter lags in cutting off after signal stops.	a. Failure of R-202.	a. Replace R-202.
	b. Failure of R-209.	b. Replace R-209.

TABLE XII TELESCOPIC MAST AB-348/MRC-20 AND CONTROL C-1328/MRC-20

TROUBLE	PROBABLE CAUSE	REMEDY
Motor fails to operate or operates slowly.	a. Loose power connection.	a. Check & tighten power cable.
	b. Brushes binding in holders.	b. Remove (see Paragraph 5-12 below) and wipe clean with a gasoline moistened cloth.
	c. Worn brushes.	c. Replace brushes (see Paragraph 5-12 below).
	d. Brushes improperly seated.	d. Reseat brushes (see Paragraph 5-12 below).
	e. Defective switch S-402.	e. Replace switch S-402.
	f. Fuse F-401 blown.	f. Replace fuse F-401.



5-2. Electronic Switch SA-359/MRC-20, Top View.



5-3. Electronic Switch SA-359/MRC-20, Bottom View.

5-5. EQUIPMENT MAINTENANCE.

5-6. TO REPLACE FUSE IN DYNAMOTOR DY-111/MRC-20. Turn XF-201 fuse holder cap located on the Dynamotor unit chassis (see figure 1-6) one quarter turn counterclockwise to remove fuse. Replace with 5 amp. rating fuse.

5-7. TO REPLACE FUSE IN TELESCOPIC MAST. Turn XF-401 fuse holder cap located on the Telescopic Mast Control C-1328/MRC-20 (see figure 1-18) one quarter turn counterclockwise to remove fuse. Replace with 20 amp. rating fuse.

5-8. TO REPLACE TUBE IN RETRANSMISSION ELECTRONIC SWITCH SA-359/MRC-20. (See figure 5-2.)

a. Release clip fasteners and remove the unit from its mount. (It will not be necessary to remove cable.)

b. Remove the retaining screws holding the dust cover in place.

c. Remove dust cover allowing access to tubes.

d. Replace defective tube.

5-9. TO REPLACE TUBE IN NOISE LIMITING SQUELCH CIRCUIT R-584/MRC-20. (See figure 5-1.)

a. Remove the lock nuts holding this unit to the top of the R-584/MRC-20 receiver (it will not be necessary to remove cable) and slide unit out from the equipment cabinet.

b. Remove the base plate allowing access to the tubes.

5-10. TO REPLACE BRUSH IN DYNAMOTOR DY-111/MRC-20. (See figure 1-6.)

a. Release the clip fasteners and remove the unit from its mount. (It will not be necessary to remove the cable unless desired.)

b. Cut the safety wire and remove the retaining screws holding the end covers.

c. Remove both end covers.

Figure 5-1. Squelch and Noise Limiter Unit for Receiver R-584/MRC-20

Figure 5-2. Electronic Switch SA-359/MRC-20, Top View

d. Unscrew the bakelite brush holder caps allowing access to the brushes.

e. Inspect and replace brushes if necessary.

f. Reassemble and replace safety wire.

5-11. TO REPLACE BRUSH IN TELESCOPIC MAST DRIVE MOTOR B-301. (See figure 1-15)

a. Cut and remove the safety wire through the brush cap nuts.

b. Remove the brush cap nuts.

c. Remove the brush retaining screws allowing access to the brushes.

d. Remove and inspect brushes - replace if necessary. Brushes may be seated to the commutator by pulling a piece of No. 000 sandpaper under the brush in the direction of rotation of the commutator using a form that has the same curvature as the commutator.

e. Reassemble and replace safety wire.

5-12. LUBRICATION OF DYNAMOTOR DY-111/MRC-20.

a. Follow steps a, b and c, paragraph 5-10 above.

b. Remove bearing plates.

c. Add enough Aero Spec M-372, Air Corps GR 375 or Lubrico M-6 Grease to just cover bearings.

Note

Do not pack bearings or get grease or dirt on the commutator.

5-13. INSTRUCTIONS FOR MODIFYING EQUIPMENT MOUNTINGS.

5-14. MOUNTING MT-1334/MRC-20.

a. Remove furnished shock mounts from a FT-154 mounting.

b. Replace with Barry mounts Type C-1010-T4 and rivet to bottom plate with flathead rivets.

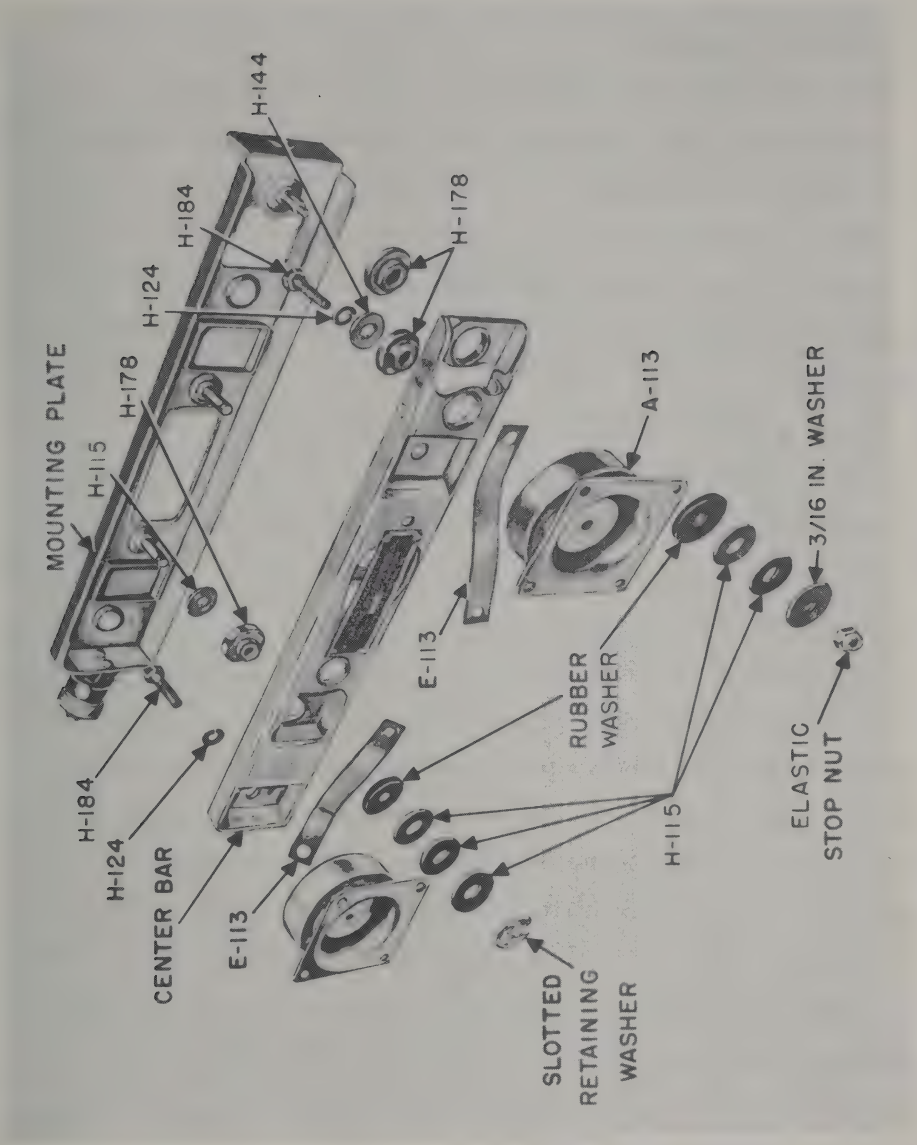


Figure 5-4. Mounting MT-1339/MRC-20, Exploded View.

c. Install top plate to the shock mounts with the furnished bolts.

5-15. MOUNTING MT-822B/ARC-27.

a. Remove furnished shock mounts from a MT-822/ARC-27 mounting.

b. Replace with Barry mounts Type 5215-HT and secure with the furnished bolts but omitting the washers.

5-16. MOUNTING MT-1339/MRC-20. (See figure 5-4)

a. Remove the two slotted retaining washers and the elastic stop nut that fasten each mounting plate to the MT-284/ART-13 frame. Remove the mounting plates.

b. Remove the ground strap and discard.

c. Remove the two slotted retaining washers and the elastic stop nut which fasten the center bar to the mounting plate and remove the center bar.

d. Set aside all rubber washers, rubber pads and hardware. Some of these will be used in reassembly.

e. Bolt two Barry mounts Type C-1015-T4 to each center bar using a 1/4-20 by 1 in. bolt H-184, lockwasher H-124 and ground strap E-113, at the second hole in from the end with the two smaller holes and using a bushing H-178, bolt H-184, plain washer H-144 and lockwasher H-124, at the second hole in from the end with the two larger holes. Be sure the center bar is the same way up as when removed (shock mounts on bottom).

f. Place H-178 bushings in the two larger holes nearest each end.

g. Replace center bar in the mounting plate with the threaded end stud engaging one bushed hole and one of the slotted studs engaging the other bushed hole.

h. Fasten to the threaded end stud using one rubber washer (set aside in step d.) two 5/16 in. plain washer H-115, one 3/16 in. washer and the

elastic stop nut (also set aside in step d.).

i. Fasten to the slotted stud using plain washer H-115, one rubber washer (set aside in step d.), three 5/16 in. plain washers H-115 and a slotted retaining washer (also set aside in step d.).

j. A pair of these form the MT-1339/MRC-20 mount for mounting the T-47A/ARC-13 transmitter.

5-17. ASSEMBLY PROCEDURE FOR TELESCOPIC MAST.

5-18. PRELIMINARY STEPS TO ASSEMBLE TRANSMISSION HOUSING. (See figures 5-5 and 5-6.) Figure 5-5. Transmission Housing A-301

Figure 5-6. Lower Mast Tube A-320 Assembly

a. Bolt two mast collar sections A-303 and A-302 to transmission housing A-301 with four each 1/4-20 by 9/16 in. bolts H-308 and lockwashers H-309.

b. Bolt mast collar section A-306 with its center slot in line with the slot in the transmission housing, with four similar bolts H-308 and lockwashers H-309.

c. Place lower mast tube A-320 in the three collars with the slot in the tube in line with the slot in collar A-306 and with the cutout on the end of the tube near the large end of the transmission housing.

d. Place the two collar sets A-304 and A-310, and A-305 and A-311, on A-320, 1 collar between A-306 and the large end of housing and the other beyond the large end of housing. These are used for mounting the mast assembly.

e. Bolt the coaxial cable tube assembly A-341 to the large end of A-301 using the gasket H-303 and six 10-24 by 1/2 in. screws H-301 and lockwashers H-302.

f. Temporarily place base assembly A-326 on the end of A-320, making sure that all holes line up properly and push tube A-320 up so that A-341

and A-326 come together with gasket H-304 placed between.

g. Bolt the three mast collar sections A-307, A-308 and A-309 to A-302, A-303 and A-306 respectively with twelve 10-32 by 7/8 in. fillister head screws H-305, plain washers H-306, lockwashers H-302 and nuts H-307.

h. Remove A-326 from A-320. It was used to properly locate tube A-320 with respect to A-301 and will be permanently installed later.

i. Place pulley O-349 in slot in housing A-301 and secure with pin H-374 through provided hole.

j. Fasten pulley O-350 to boss on inside of housing with a 10-24 by 1 in. fillister head screw H-352 and with two flat washers H-306 (one under pulley and one on top) and lockwasher H-302.

k. Screw cable extension Tube A-340 in the hole in the small end of A-301.

5-19. ASSEMBLY OF FIRST MAST TUBE A-321.

a. Fasten bearing O-362 with pulley O-363 to mast tube A-321 with two 8-32 by 7/16 in. screws H-382 and lockwasher H-327. (See figure 5-7.)

b. Fasten cable guard A-329 to bearing with two 8-32 by 1/2 in. screws H-393 and lockwashers H-327.

c. Place mast tube A-321 in line with lower mast tube A-320 with the end with bearing nearest A-320.

d. Feed the 15 ft - 6 in. length of 1-16 in. steel cable from inside of housing A-301 out through the small tube A-340 and down and around the pulley O-363, under cable guard A-329 and up along the side of mast tube A-321.

e. Keeping hold of free cable end, insert mast tube A-321 into lower mast tube A-320 and push in until only 6 or 8 inches extend.

f. Fasten bottom half of clamp A-330 (see figure 5-6) to A-320 with a 10-32 by 1/2 in. screw H-313 and lockwasher H-302.

Figure 5-7. First Mast Tube A-321, Lower End

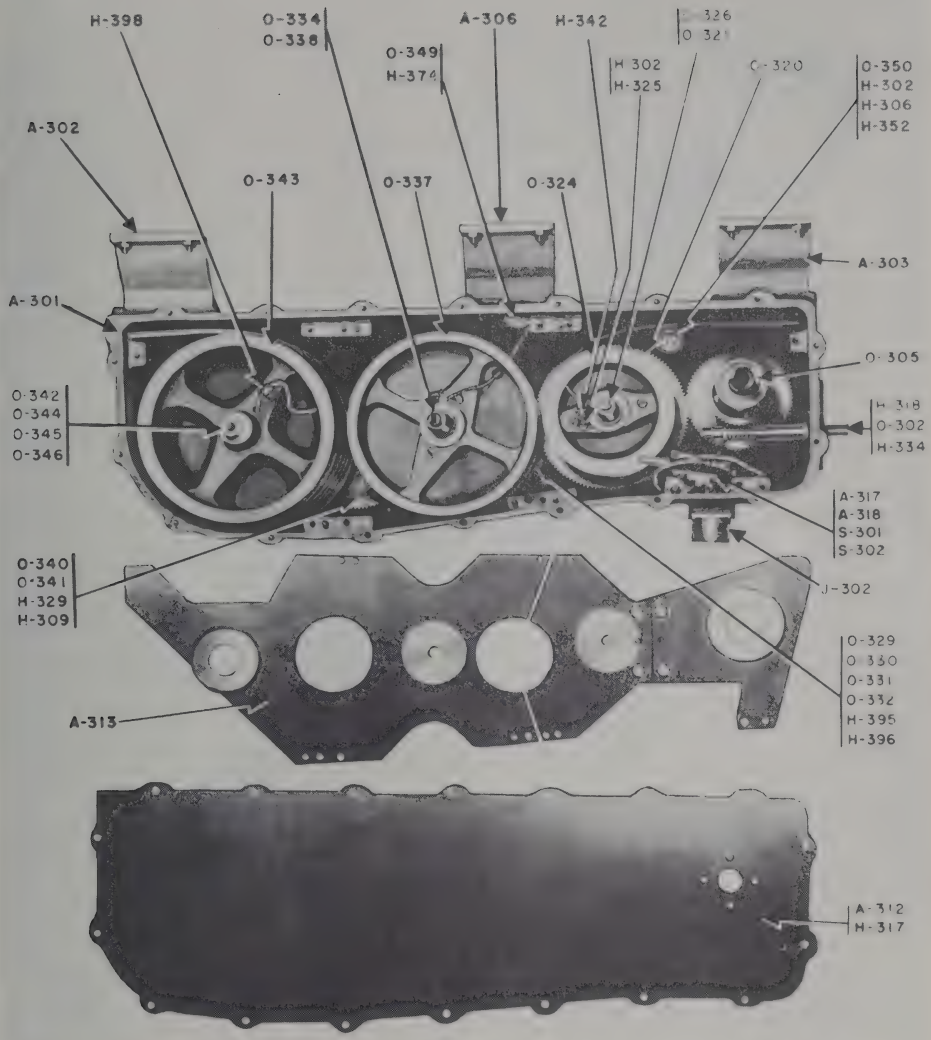


Figure 5-5. Transmission Housing A-301

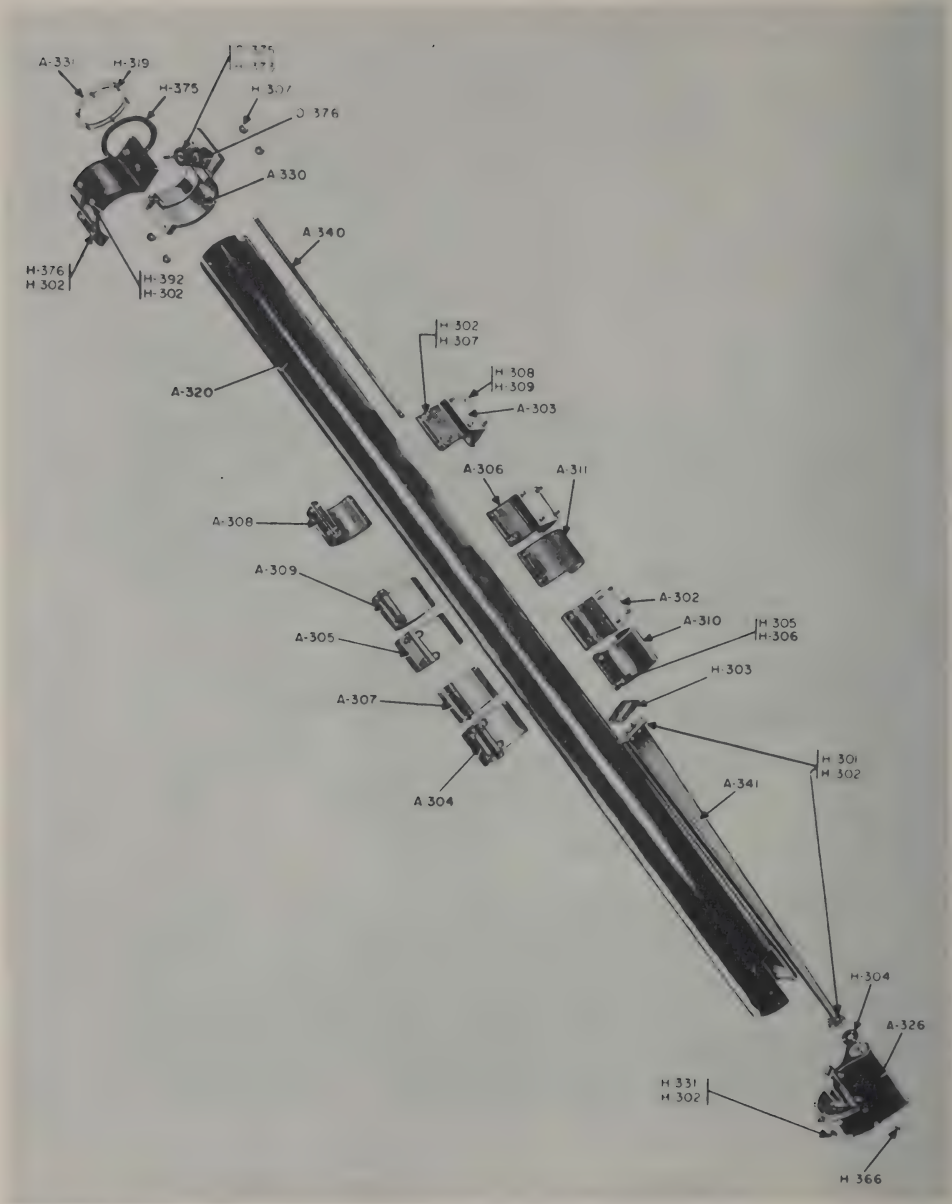


Figure 5-6. Lower Mast Tube A-32 Assembly.

g. Put a Nicopress sleeve H-394 on free end of cable coming out of A-301, make a loop for No. 10 screw and crimp the sleeve.

h. Place pulleys O-375 and O-376 in the recess in the other side of clamp A-330. Pulley O-375 is mounted on roll pin H-373 and pulley O-376 by screw installed in step j.

i. Pass cable coming out from the other side of A-320 and tube A-340, around pulley O-375 and under pulley O-376.

j. Mate top half of clamp A-330 with bottom half installed in step f. and fasten with four 10-32 by 1-1/8 in. screws H-376, H-302 lockwashers and H-307 nuts. One of these should secure the loop in cable made in step g. and another the pulley O-376.

k. Fasten cable end in housing A-301 to elevating cable drum O-324 by feeding cable through the hole in drum, then through the small hole in pin H-342, back around H-342 and around the 10-32 by 7/16 in. fillister head screw H-325 with H-302 lockwasher placed in tapped hole in drum and bringing free end under cable between H-342 and H-325. Tighten H-325 to secure.

l. Screw lead shaft O-326 through drum O-324, put thrust washer O-321 on end of shaft against shoulder and gear O-320, against washer O-321. Wind cable around drum counterclockwise until slack is taken up and then set drum shaft in second hole in housing (from small end).

m. Set clutch assembly O-305 in place in first hole in case meshing gear on clutch assembly with gear on cable drum. This will keep cable from unwinding. Gears should be given a light coating of Beacon #325 grease or its equivalent when assembled.

n. Wire receptacle J-320 according to schematic, figure 5-10, and fasten to boss on outside of housing with four 4-40 by 3/8 in. screws

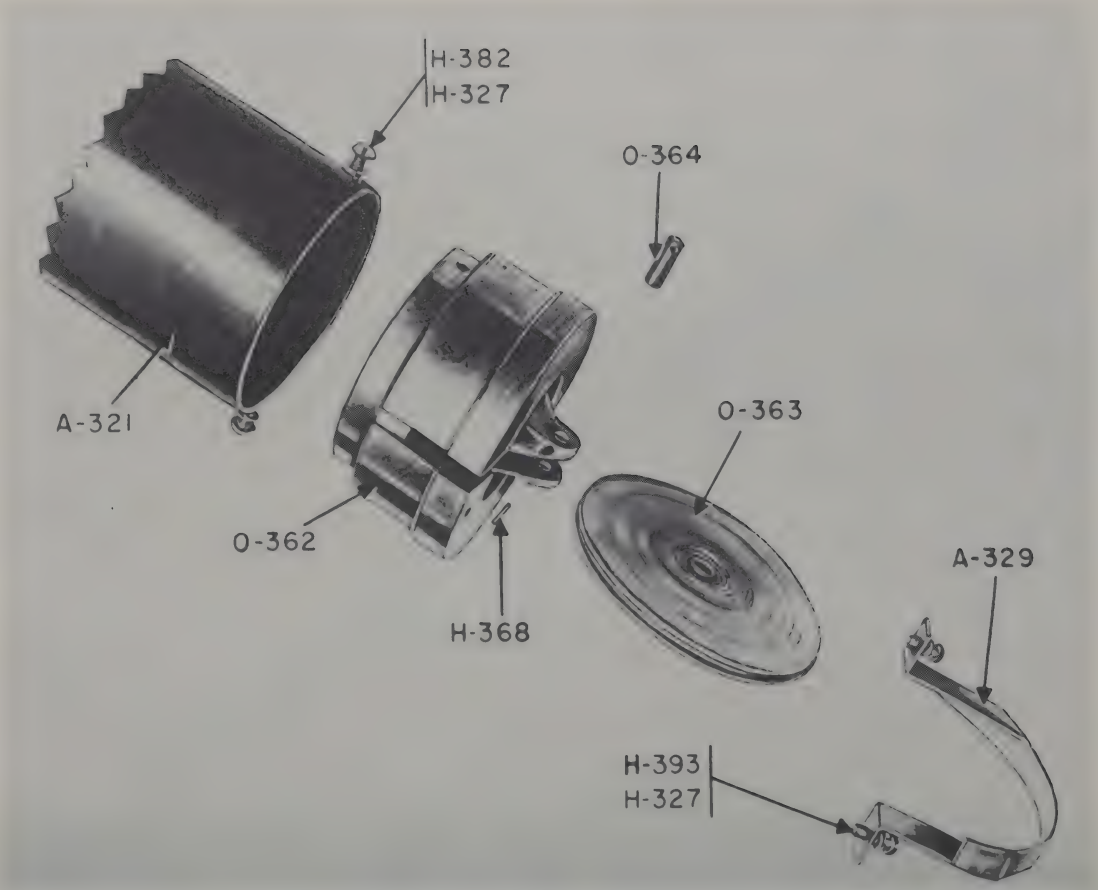


Figure 5-7. First Mast Tube A-321, Lower End.

Figure 5-8. Typical Mast Tube.

H-344 and lockwashers H-345.

o. Install microswitch assembly which includes plate A-318, bracket A-317 and microswitches S-301 and S-302, by securing bracket to boss on inside of housing with two 10-32 by 7/16 in. screws H-325 and H-302 lockwashers. Connect switches according to schematic, figure 5-10.

5-20. ASSEMBLY OF MAST TUBES A-322, A-323 and A-324. (See figure 5-8.)

a. Insert mast tube A-322 (which has on bottom end, bearing O-365 with steel cable attached) into mast tube A-321 until approximately six inches of tube extends, keeping cable ends straight to prevent crossing within the tube.

b. Slide seal H-375 and retainer A-331 over mast tube A-321 and fasten to clamp A-330 with six 5/40 by 3/8 in. flat head screws H-319.

c. Insert mast tube A-323 (with bearing O-366 and steel cable attached on bottom end) into mast tube A-322 until approximately six inches of tube extends, keeping cable ends straight to prevent crossing within the tube.

d. Fasten bottom half of collar A-332 to top of mast tube A-322 with a 10-32 by 3/8 in. screw H-326 and H-302 lockwasher.

e. Place pulleys O-383 and O-384 into recesses in A-332 with a cable end going around each pulley. Make sure cable is free within tube.

f. Mate top half of collar A-332 with bottom half and fasten to A-322 with H-326 screw and H-302 lockwasher.

g. Feed cable ends through the holes in clamp A-330 and push collar A-332 up to this clamp.

h. Fasten the two halves of collar A-332 together with two 10-24 by

3/4 in. screws H-357 and H-302 lockwashers. These screws should go through the pulleys installed in step e.

i. Slide seal H-385 and retainer A-333 on to mast tube A-322 and fasten on to A-322 with six 5-40 by 3/8 in. flat head screws H-319.

j. Insert mast tube A-324 (with bearing O-367 and steel cable attached) into mast tube A-323 and repeat steps c. to h., but using collar A-334, pulleys O-377 and O-378; seal H-386, retainer A-335 and feeding cable ends from collar A-334 into holes in collar A-332.

k. Put collar A-336 on mast tube A-324 in the same manner using pulleys O-379 and O-380, seal H-387, retainer A-337 and feeding cable ends from A-336 into holes in collar A-334.

5-21. ASSEMBLY OF MAST TUBE A-325 AND COAXIAL CABLE. (See figure 5-9.)

a. Fasten tension spring O-387 to bearing O-368 at end of mast tube A-325.

b. Feed a 29 ft. length of steel cable from inside of housing A-301 around pulley O-349 (installed in paragraph 5-18, step i.) into the lower mast tube A-320 down A-320, through slot in side of bearing O-362 and around small pulley O-361 in the base assembly A-326, back up through center of all mast tubes and fasten to other end of tension spring O-387 with a loop and splicing sleeve H-394. This cable passes by pulley O-363 on the upper side.

c. Fasten the free end of cable (extending from housing A-301) to retracting cable drum O-337 in the same manner as in paragraph 5-19, step l. Roll cable on drum clockwise.

d. Place bushing O-331 on the shaft O-330 which carries the tachometer

gear O-329 and insert in the hole in housing between the retracting and elevating drums.

e. Place bushing O-332 on outer end of shaft and press in place against the shoulder in housing.

f. Place thrust washer H-395 against bushing O-332 and fasten with truarc ring H-396 placed in the slot in O-330.

g. Screw tachometer cable coupling O-333 into the boss in housing.

h. Bolt idler gear, assembly O-340 on shaft O-341, through hole in housing A-301, below tachometer coupling with nut H-329 and lockwasher H-309.

i. Screw lead shaft O-338 into retracting cable drum O-337, place retracting gear assembly O-334 on O-338 and set in place between O-329 and O-340 with gears properly meshed. Lubricate gears as in paragraph 5-19, step a.

j. Place bearing O-345 on coaxial cable drum shaft O-344 and lock on with snap ring O-346.

k. Insert shaft in hole in boss near large end of housing A-301 from outside and push in until bearing is tight against boss and shaft enters housing. Secure with joint housing A-316 which is held to A-301 with four 10-32 by 5/8 in. fillister head screws H-331.

l. Feed a 33 ft. length of RG-58C/U cable down through mast tube A-325 on down through all assembled mast tubes around the large pulley O-359, mounted in the base assembly A-326, out through the hole in A-326 which mates with coaxial cable tube A-341, up through this tube and into housing A-301.

m. Feed cable end entering housing down through the hole in coaxial cable drum O-343 until about 2 feet extends through drum.

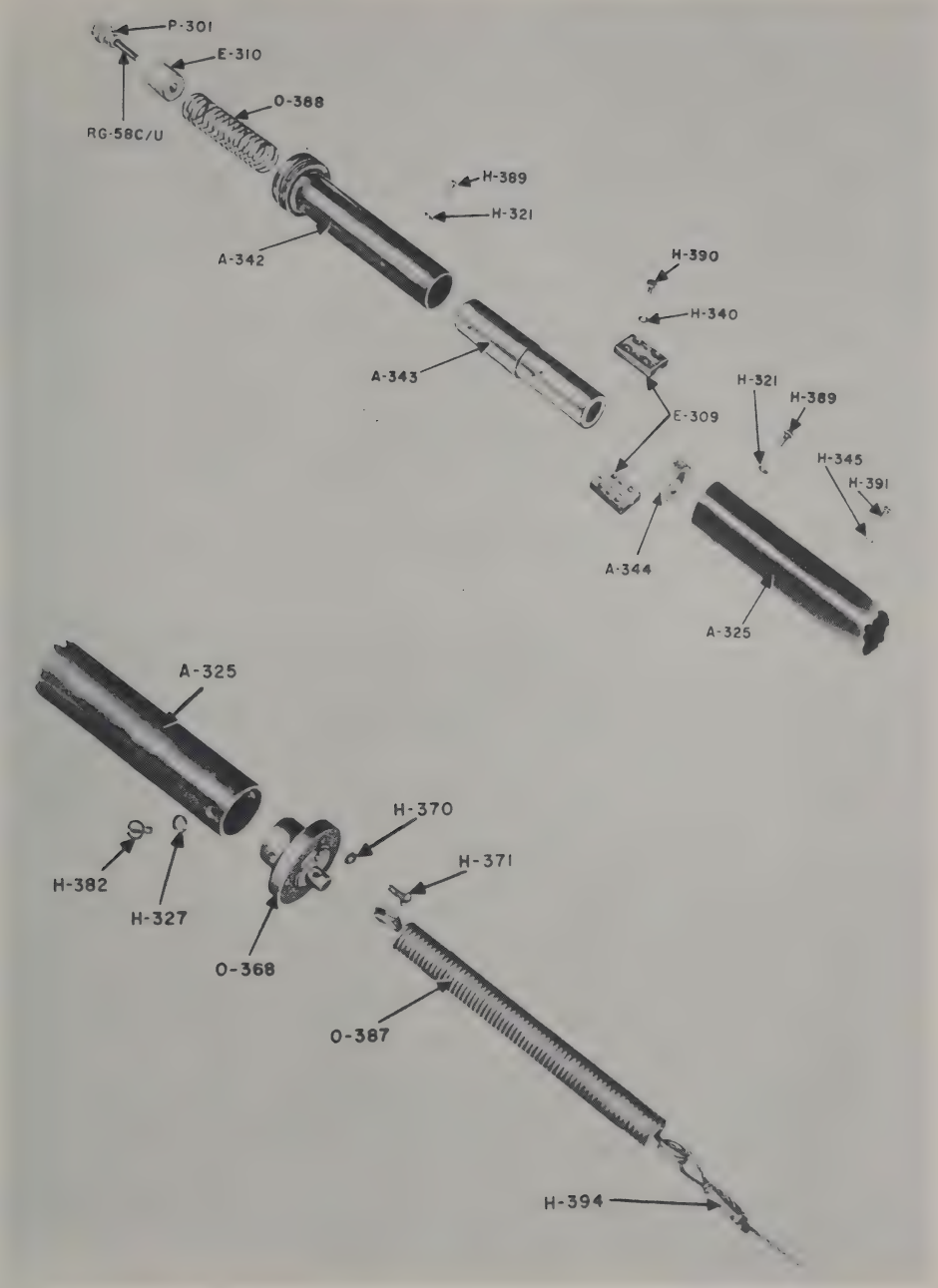


Figure 5-9. Top Mast Tube A-325 Assembly

n. Wind balance of slack in cable tightly in the grooves on the cable drum clockwise until the drum is full. Place full drum on its shaft O-344 aligning the hole in the drum axis with the hole in the shaft to allow the coaxial cable to be fed through shaft (see paragraph 5-22) and secure with the dowel pin H-374. The drum gear O-342 should mesh with the idler gear O-340. This will keep cable from unwinding.

o. Place base assembly A-326 on the lower mast tube A-320, taking up the slack in the cables from the top end of the mast tubes, lining up all holes and placing gasket H-304 between A-326 and coaxial cable tube A-341 and fasten with eleven 10-32 by 3/8 in. screws H-331 with H-302 lockwashers around base assembly and three 10-24 by 1/2 in. screws H-301 with H-302 lockwashers in flange of A-341.

p. Insert top mast tube A-325 into mast tube A-324 until approximately six inches extend, at the same time winding up the resulting slack in the retracting cable on the retracting cable drum O-337. The drum will have to be removed from housing to do this.

q. Install the collar assembly A-338 to A-325 in the same manner as with A-332 (paragraph 5-20, step d. through h.).

r. Slide seal H-388 and retainer A-339 on to A-325 and fasten with six H-319 screws.

s. Wind up the retracting cable on its drum tightly and return drum to its position in housing.

t. Pull the coaxial cable extending from the end of the top mast tube until the stretch is taken out of the spring O-360 in the base assembly and secure by placing cable clamp E-309 on cable and against stop A-344 and tightening the four 3-48 by 3/8 in. screws H-390 in the clamp.

u. Fasten the ends of each of the steel cables coming from the collars by feeding it through the hole in the preceding collar, making a loop in the end with a H-394 splicing sleeve and securing the loop under a 10-24 by 1/2 in. screw H-355, flatwasher H-306 and lockwasher H-302 to the collar at the tapped hole.

5-22. ASSEMBLY OF COAXIAL CABLE CONNECTION.

a. Feed the 2 foot end of coaxial cable extending from the inner section of the cable drum left in paragraph 5-22, step m., through the aligned holes in drum axis and shaft O-344 until about eight inches extends beyond the outer end of shaft.

b. Remove 2 inches of the outer covering and the shield braid from the end leaving about 3/4 in. of braid exposed.

c. Strip insulation from the end of the center conductor leaving 7/8 in. unstripped as measured from the cut end of the outer covering.

d. Slide the sleeve O-347 and insulator E-301 on the insulated portion of the center conductor with the sleeve flush against the cut end of outer covering. Make two pigtails with the shield braid and solder into the two lugs on the sleeve. Press lugs down against the cable after soldering.

e. Slide the contact E-304 on the bare center conductor until it is against the shoulder of the insulator E-301 with E-301 tight against O-347 and solder in place.

f. Pull cable from the inside of the cable drum until the sleeve O-347 is flush against the shoulder in the drum and fasten it under the cable clamps H-397 and H-398.

g. Insert insulator E-302 into shaft O-344 and against insulator E-301.

h. Insert the rotary connector assembly into the housing joint A-316 and against the insulator E-302 making sure that the contact E-303 in the rotary connector mates with the contact E-304. Secure in place with the end cap A-315 fastened to the housing with four 5-40 by 7/16 in. long fillister head screws H-334 and H-335 lockwashers.

5-23. FINAL ASSEMBLY OF TRANSMISSION HOUSING A-301. (See figure 5-5.)

a. Place drive shaft assembly O-302 in place meshing the worm on O-302 with the gear on the clutch assembly.

b. Place retaining plate H-318 on top of the bearing on O-302 and fasten to housing with four 5-40 by 1/2 in. long screws H-384 at the tapped holes.

c. Place motor B-301 on studs, meshing spline on drive shaft with spline on motor shaft and fasten with four 5/16 nuts H-311. Lock nuts with safety wire.

d. Connect motor wires according to schematic diagram, figure 5-10.

e. Fasten the three parts of the bearing plate A-313 in position with eleven 10-32 by 3/4 in. fillister head screws H-354 and H-302 lockwashers.

f. Adjust the elevating drum O-324 and retracting drum O-337 by turning the screw leads O-326 and O-338 until the cable coming off the pulleys is level and straight. With the mast sections completely telescoped, the retracting drum should be nearly full of cable and the elevating drum should have 2 or 3 turns.

g. Lock screw leads O-326 and O-338 in place with lock O-327 and O-328 placed in slot and secured with 8-32 by 3/8 in. screw H-358, flatwasher H-341 and lockwasher H-327.

h. Fasten cover A-312 to housing A-301 using cover gasket H-317 and eighteen 10-32 by 1/2 in. screws H-313 and lockwashers H-302.

5-24. ASSEMBLY OF ANTENNA COUPLING SECTION.

a. Place coupling insert A-343 in top mast section and fasten with three 6-32 by 1/4 in. screws H-389 and lockwashers H-321.

b. Place adapter tube A-342 on A-343 and fasten with H-389 screws and H-321 Lockwashers.

c. Place spring O-388 inside the adapter tube with the spacer E-310 on top.

d. Install the UG-88/U plug P-301 on the end of the coaxial cable, cutting the cable if necessary so that P-301 is as near the spacer as practicable.

Figure 5-10 Schematic: Telescopic Mast Control

Figure 5-11 Dynamator Unit, DY-111/MRC-20

Figure 5-12 Schematic: Electronic Switch, SA 359/MRC-20

Figure 5-13 Schematic: Squelch and Noise Limiter Circuit

Figure 5-14 Schematic: Conversion for BC-348 Q Receiver

Figure 5-15 Schematic: Conversion for B.C.-348R Receiver

Figure 5-16 Schematic: Remote Switching Control C-1329/MRC-20

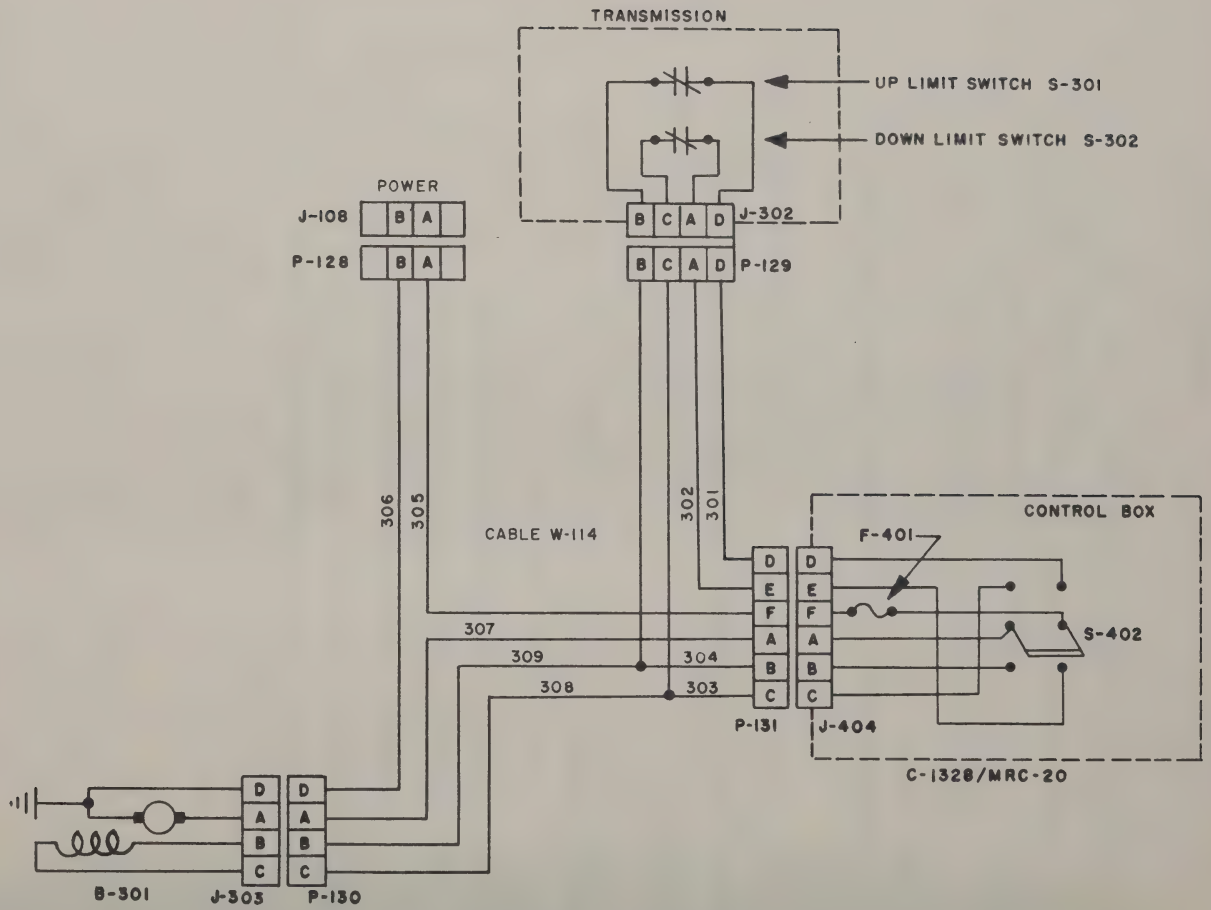


Figure 5-10. Schematic: Telescopic Mast Control.

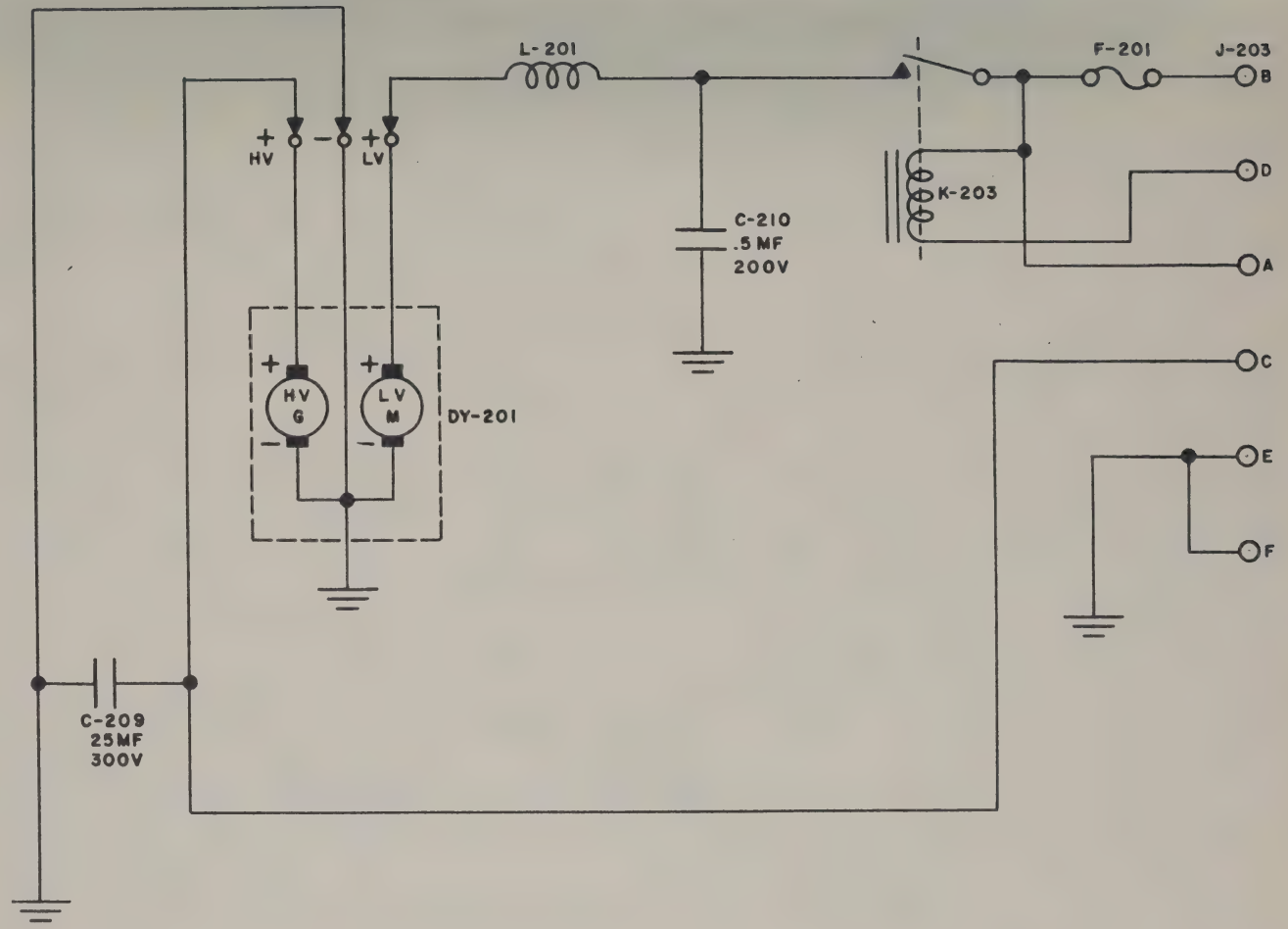


Figure 5-11. Dynamotor Unit, DY-111/MRC-20.

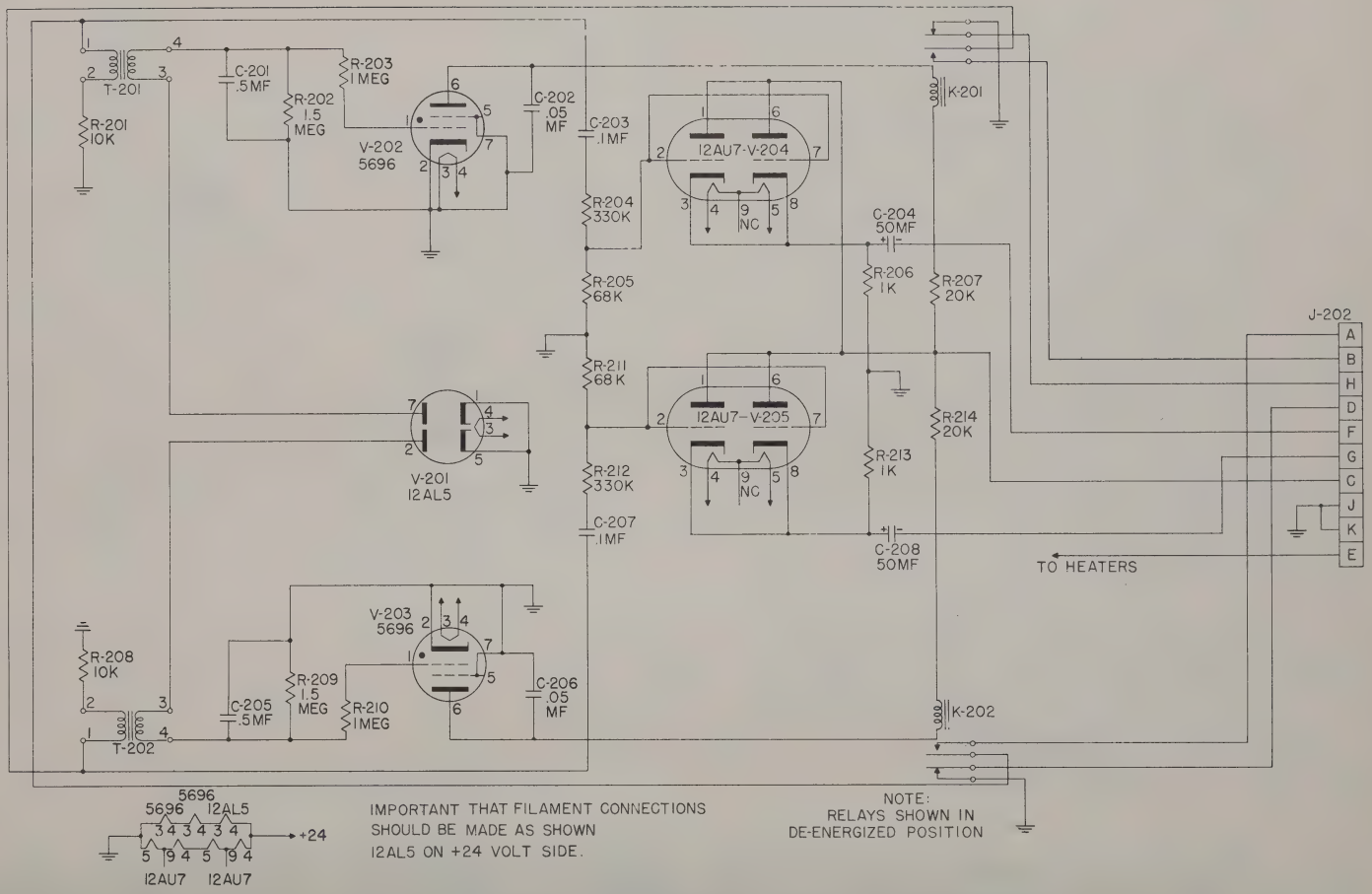


Figure 5-12. Schematic; Electronic Switch, SA-359/MRC-20.

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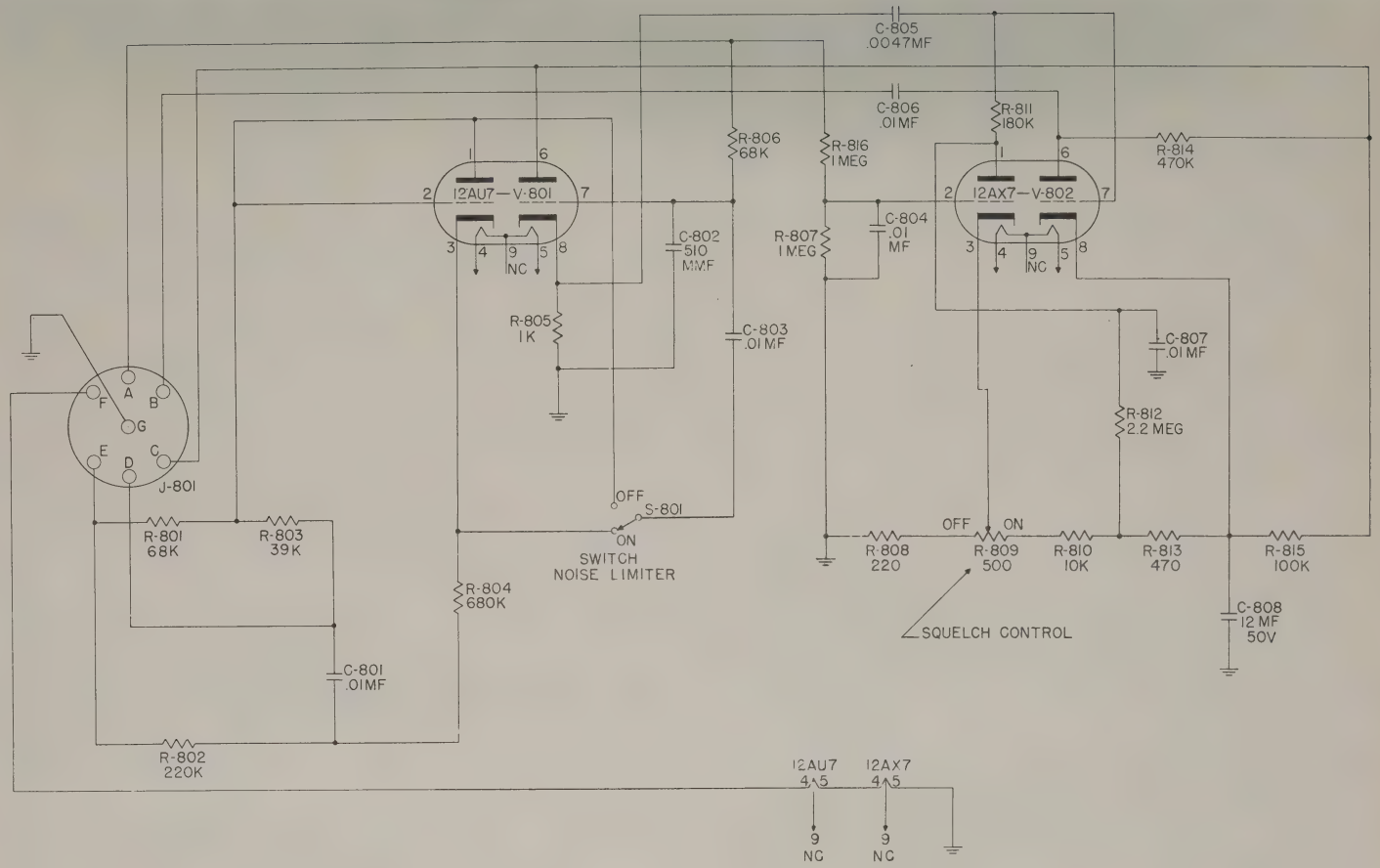

Figure 5-13. Schematic: Squelch and Noise Limiter Circuit.

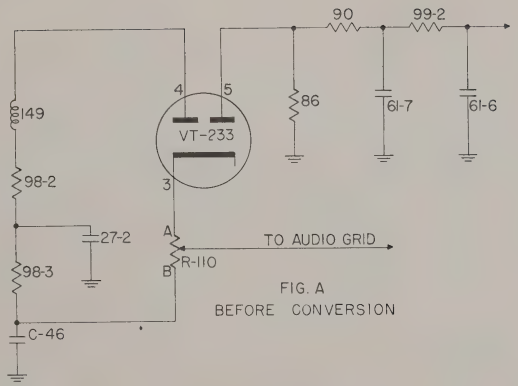

FIG. A
BEFORE CONVERSION

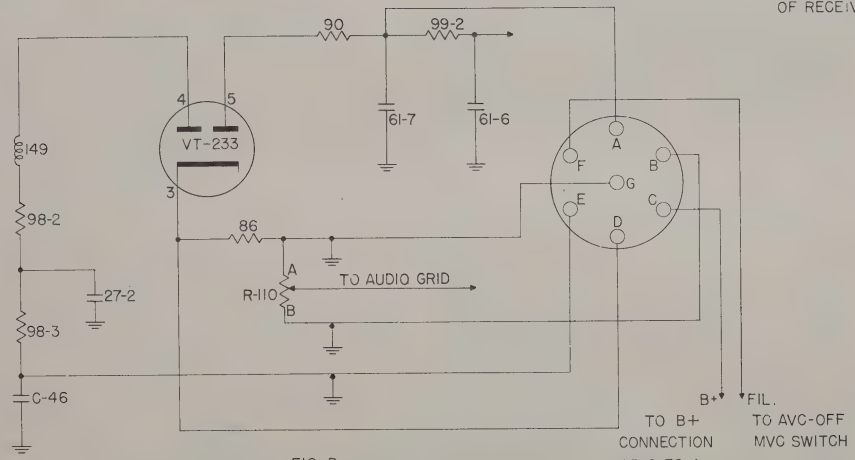

FIG. B
AFTER CONVERSION

CONVERSION STEPS:

1. IN FIG. A VOLUME CONTROL R-110 IS DISCONNECTED AT POINTS "A" & "B". A LEAD IS BROUGHT OUT FROM PIN "E" OF J-802 AND CONNECTED TO JUNCTION OF R-98-3 AND C-46 IN BC-348-Q. A SECOND LEAD IS BROUGHT FROM PIN "D" OF J-802 AND CONNECTED TO THE CATHODE OF VT-233 IN BC-348-Q. POINT "A" ON THE VOLUME CONTROL IS GROUNDED AND POINT "B" IS CONNECTED TO PIN "B" OF J-802.
2. PIN "A" OF J-802 IS CONNECTED TO THE JUNCTION OF R-99-2 AND R-90 IN BC-348-Q (FIG. "B").
3. RESISTOR 86 IS DISCONNECTED FROM PIN 5 (VT-233) AND CONNECTED TO PIN 3 (VT-233).
4. LEADS ARE BROUGHT FROM FILAMENT VOLTAGE (F) AND B+ (C) OF J-802 AND CONNECTED AS INDICATED IN SCHEMATIC. ATTENTION SHOULD BE GIVEN TO PLACING FILAMENT VOLTAGE ON SIDE OF PLUG FOLLOWING LINE SWITCH, OTHERWISE FILAMENT WILL BE LIT AT ALL TIMES.
5. SHIELDING OF SHIELDED CABLES ARE CONNECTED TO GROUNDED CONNECTION OF BC-348-Q.
6. LEAD FROM PIN "G" OF J-802 IS CONNECTED TO GROUNDED CONNECTION OF RECEIVER.

Figure 5-14. Schematic: Conversion for BC-348Q Receiver.

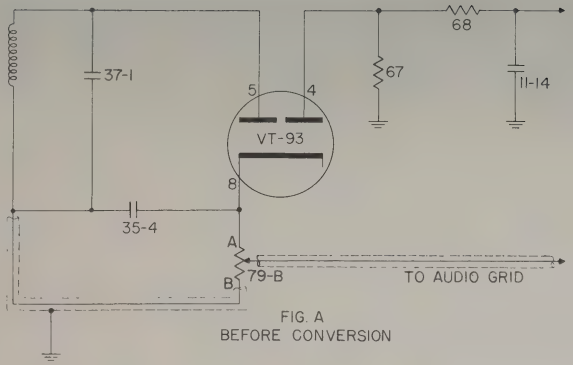

FIG. A
BEFORE CONVERSION

CONVERSION STEPS:

1. IN FIG. A VOLUME CONTROL 79-B IS DISCONNECTED AT POINTS "A" & "B". A LEAD IS BROUGHT OUT FROM PIN "E" OF J-802 & CONNECTED TO TERMINAL #24 OF TERMINAL BOARD TB-2. A SECOND LEAD IS BROUGHT FROM PIN "D" OF J-802 & CONNECTED TO TERMINAL #29 OF TERMINAL BOARD TB-2. POINT "A" OF VOLUME CONTROL IS GROUNDED & POINT "B" IS CONNECTED TO PIN "B" OF J-802.
2. PIN "A" OF J-802 IS CONNECTED TO TERMINAL #25 OF TERMINAL BOARD TB-2.
3. LEAD FROM PIN "C" OF J-802 IS CONNECTED TO TERMINAL #30 OF TERMINAL BOARD TB-2. LEAD FROM PIN "F" OF J-802 IS CONNECTED TO TERMINAL "B" OF CONDENSER 49-4.
4. PIN "G" OF J-802 IS CONNECTED TO GROUND OF BC-348-R. SHIELDING OF SHIELDED CABLES ARE CONNECTED TO GROUNDED CONNECTION OF BC-348-R.

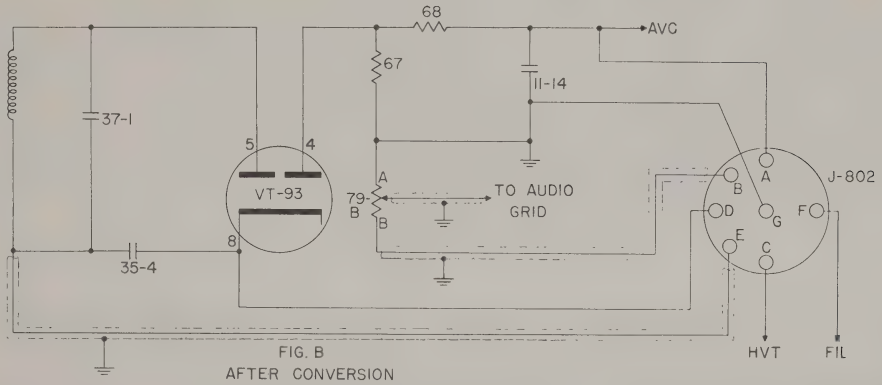

FIG. B
AFTER CONVERSION

Figure 5-15. Conversion for BC-348R Receiver.

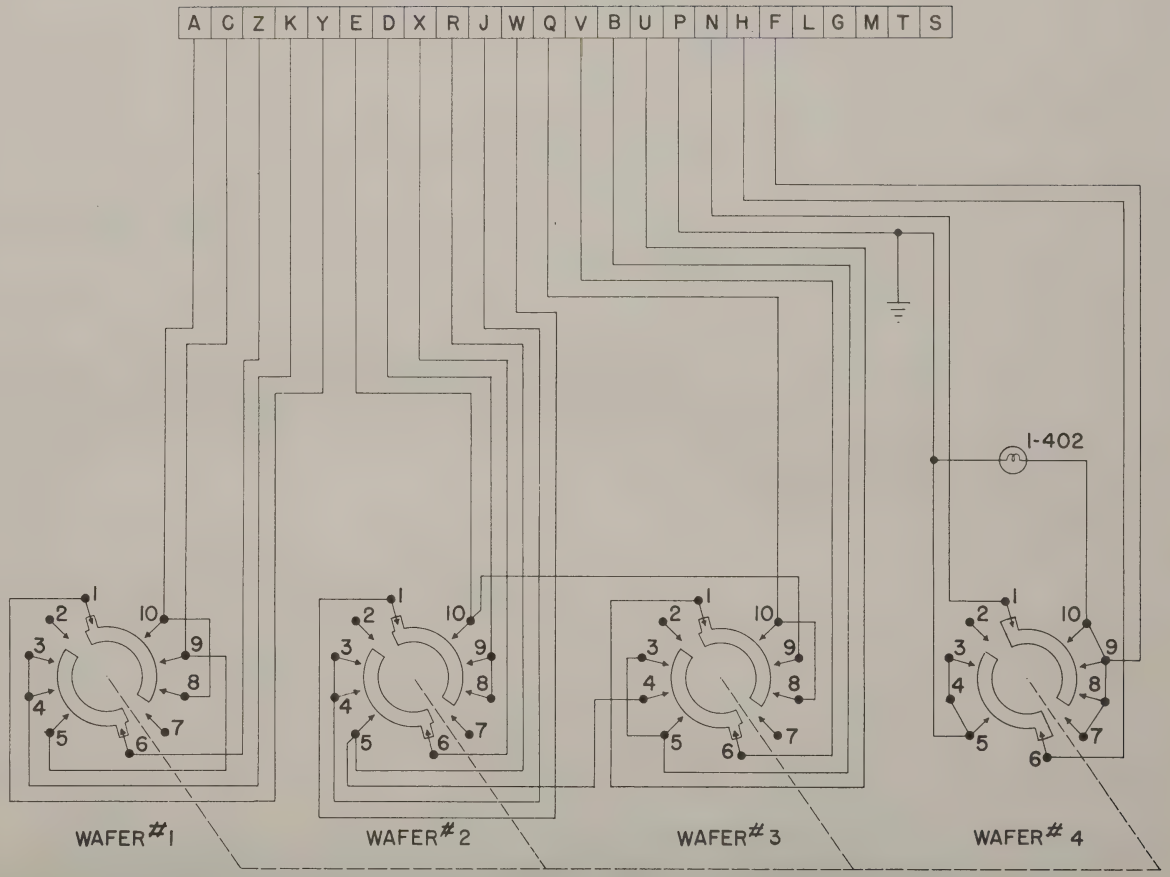

Figure 5-16. Schematic: Remote Switching Control C-1329/MRC-20.

5:25. EQUIPMENT SPARE PARTS.

TABLE XIII EQUIPMENT SPARE PARTS INCLUDED WITH EACH EQUIPMENT

QTY	DESCRIPTION	PART NUMBER
1	Capacitor, Fixed, Electrolitic	CE64C120M
1	Capacitor, Fixed Electrolitic	CE63C500G
1	Capacitor, Fixed, Electrolitic	CE41C250N
5	Fuse, 20 Amp, Bussman Type AGC	F03A20R0A
5	Fuse, 5 Amp, Bussman Type	F02A5R00A
5	Lamp, Incandescent, CE	313
1	Antenna Section	MS-53
1	Antenna Section	MS-49
1	Antenna Assembly AT-462/MRC-20 (VHF)	10750
3	Bushing, Insulated	10774
1	Antenna Assembly AT-463/MRC-20 (UHF)	10786
1	Crank, Hand, Telescopic Mast	1370
3	Tube, Electron	JAN-12AU7
2	Tube, Electron	JAN-5696
2	Tube, Electron	JAN-12AL5
2	Tube, Electron	JAN-12AX7

SECTION VI

PREPARATION FOR RESHIPMENT

6-1. RESHIPMENT OF AN/MRC-20 EQUIPMENT.

6-2. AN/MRC-20 EQUIPMENT INSTALLED IN M-37 OR M-38 TRUCK.

a. Remove HF Antenna sections, MS-49 through MS-53.

b. Uncouple the VHF antenna lead, cable W-721, and pull through the grommeted hole in the truck side wall. It will be necessary to remove the grommet to allow the cable connector to come through the hole.

c. Remove the VHF antenna mast at the MP-50 mounting base by removing the two hex nuts H-706 installed in paragraph 3-13, steps f. and g. and package with the HF antenna removed in step a.

d. Remove the lower mounting collar A-935 on the telescopic mast installed in paragraph 3-14, step n.

e. Remove the two 3/8-16 by 3/4 in. bolts H-936 installed in paragraph 3-14, step m.

f. Rotate the telescopic mast forward until it rests on the rest support A-492 (or A-941 in the M-37 truck) and secure with the mounting collar A-935 and the bolts,nuts and lockwashers removed in step d.

g. Close all doors and covers and fasten securely.

h. Place the plastic cover CY-1487/MRC-20 over the Control Group Assembly.

i. Place the canvas cover A-912 over the HRU-28-A power plant.

j. Package the MT-1340/G fire extinguisher mounting, the MT-1338/MRC-20 power unit mountings and the RC/411/G power cable reel with the W-112 cable installed and place in the cab of the M-38 truck. This applies to the M-38 truck only and assumes the trailer not shipped.

k. The truck with equipment may then be transported by a suitable aircraft or over the road.

6-3. AN/MRC-20 EQUIPMENT ONLY. Procedure for packaging should follow the established practice for the shipping of electronic equipment. Disassemble the equipment by reversing the installation procedure followed in paragraph 3-2 through 3-29. It is suggested that the following be followed:

a. Package I: Control Group Assembly complete with controls and attached cables and other cables.

b. Package II: Storage batteries with electrolyte removed and packaged separately.

c. Package III: Electrical Equipment cabinet complete with contents.

d. Package IV: The telescopic mast, the VHF mast, the HF, VHF, and UHF antennas.

e. Package V: The HRU-28A Power Plant.

f. Package VI: All mounting parts and related equipment.

[AG 413.44 (26 Jan 54)]

BY ORDER OF THE SECRETARY OF THE ARMY:

M. B. RIDGWAY,
General, United States Army,
Chief of Staff.

OFFICIAL:

WM. E. BERGIN,
Major General, United States Army,
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NG: None.

USAR: None.

For explanation of distribution formula, see SR 310–90–1.

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